THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

[Registered as a Newspaper.]

Vol. XXVIII. No. 696.] LONDON, SEPTEMBER 12, 1876. [28th Year.] Price 6d.

RAMSAY'S NEWCASTLE CANNEL COAL. Analysis—12,000 cubic feet of gas per ton of coal; 28-candle gas; coke 66·70 per cent.; volatile matters 33·30 per cent. Coke of good quality.

RAMSAY'S PATENT CONDENSED GARESFIELD COKE.

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RAMSAY'S FIRE-CLAY ARTICLES. GAS-RETORTS, introduced 1838. FIRE-BRICK WORKS, established 1804. FIRE-CLAY SANITARY PIPES, CHIMNEY-TOPS, and all Goods made of Fire-Clay. The Fire-Clay is worked from Blaydon Main Colliery, is of excellent quality, and no expense spared in perfecting every article. The FIRE-BRICKS (marked "RAMSAY") are to be seen in all parts of the world, and the Works are the most extensive in the Kingdom.

Manufactories—Derwenthaugh, Swalwell, and Hebburn Quay, near Newcastle-on-Tyne.

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GENUINE TORBAY PAINT
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SPECIAL GASOMETER PAINT
(Mixed ready for use).

These Paints are now used in 100 Country Gas-Works, and by all (but one) of the London Gas Companies, on Gasholders, Scrubbers, Purifiers, &c. They will cover tar effectually. Also used by the Admiralty, War Office, Railway Companies, Founders, &c.

They prevent and arrest rust, and protect iron from the action of water, sulphurous and gaseous exhalations.

The covering powers are considerably greater than those of any other Paint.—*See "Engineer," Nov.* 2, 1866.

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FOR
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JOSEPH COWEN and CO.,
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Were the only parties to whom a Prize Medal was awarded at the Great Exhibition of 1851, for "Gas-Retorts and other Objects in Fire-Clay," and they were also awarded at the International Exhibition of 1862, the Prize Medal for "Gas-Retorts, Fire-Bricks, &c., for Excellence of Quality."

J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts and Fire-Bricks in the Kingdom. Orders for Fire-Clay Retorts of all shapes and dimensions, and to fit any shaped Mouthpiece, Fire-Bricks, and every other article in Fire-Clay, are promptly executed at their Works as above.

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Established at the commencement of Gas Lighting.
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J. R. and Co. make all kinds of Tubes and Fittings for Gas, Steam, and Water; Gun-Metal Cocks, Stocks, and Dies; Galvanised Tubes and High-Pressure Tubes, &c.

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Established 1830.

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MANUFACTURERS OF
TELESCOPIC & SINGLE GASHOLDERS,
CAST & WROUGHT IRON TANKS FOR DITTO,
And Gas Apparatus of every Description.
Marine, Tubular, Cornish, Plain, Furnace, Saddle, and Range Boilers.
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RETORT-SETTING A SPECIALITY.

RETORTS SET, AND GUARANTEED TO BURN OFF A CERTAIN AMOUNT OF COAL OR ELSE NO MONEY TAKEN FOR THE CONTRACT.

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NATIONAL STANDARD GASOMETERS

FOR THE ENGLISH GOVERNMENT
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Presented by Her Majesty's Government to the French Government,
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IMPROVED DRY GAS-METERS

Warranted to Measure correctly & not to vary.

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HANDRAIL TUBINGS, IRON AND BRASS, PLAIN OR TWISTED,
TELEGRAPH TUBES OR POLES, &c., &c.

LAMBERT BROTHERS, WALSALL.

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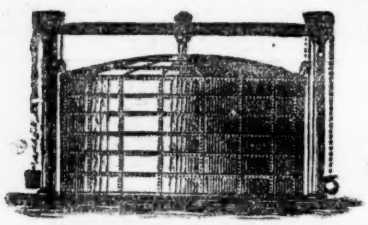

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ARE NOW PREPARED TO SUPPLY AND ERECT THEIR PATENTED MACHINERY FOR

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And to enter into arrangements with GAS COMPANIES for its use upon moderate terms of Royalty.

The Patented Machinery has secured the approbation of all Engineers who have visited the MAIDSTONE GAS-WORKS, *where it is in full operation, and may be inspected at any time on application to the Manager.*

The advantages attending its use are—

INCREASED VOLUME OF GAS PER TON.—INCREASED YIELD PER RETORT.—INCREASED BULK OF COKE FOR SALE.—REDUCTION IN LABOUR AND LESS DEPENDENCE ON SKILLED STOKERS.

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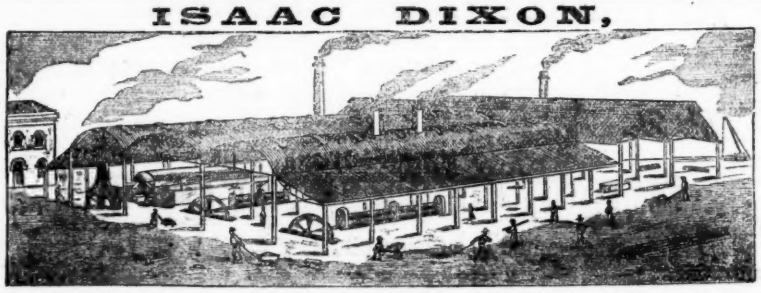
ISAAC DIXON,

WINDSOR IRON-WORKS, LIVERPOOL.



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ERECTED COMPLETE IN THIS COUNTRY

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EITHER WITH

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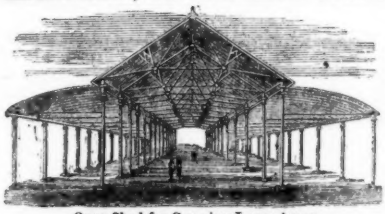

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The superiority of the material supplied by this Company is generally recognized, and it is now in use in nearly all the London and most of the large Provincial Gas-Works.

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SELF-ACTING REMOVABLE DIP-PIPE,

PATENTED BY

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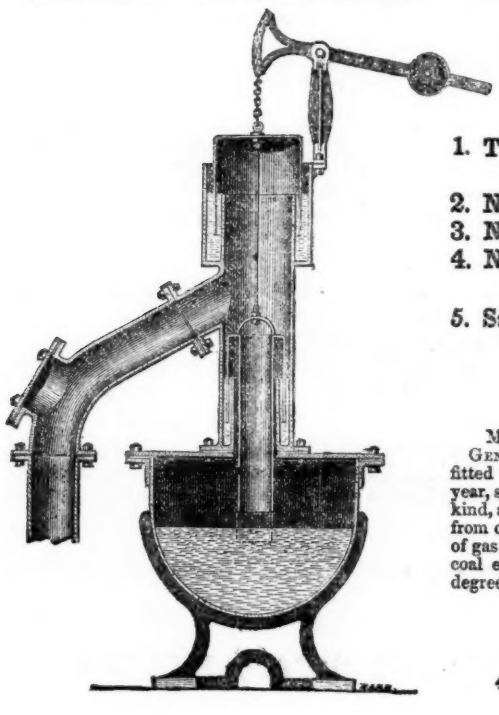

ADVANTAGES.

1. There is no pressure on the Retorts.
2. No deposit of Carbon.
3. No scurfing is required.
4. Never a choked Ascension-Pipe.
5. Saves Fuel and Wear and Tear.
6. Gets 10 per cent. more Gas out of the Coal, and a higher Illuminating Power.
7. Is never out of order.
8. Requires no attention.
9. Is perfectly automatic in its action.

TESTIMONIAL.

Tenby Gas-Works, March 20, 1876.

MESSRS. CHANDLER AND STEVENSON.

GENTLEMEN,—In reply to your inquiry, I have to say that all the retorts at these works are fitted with your Self-Acting Patent Dip-Pipes. They have been in use now for more than a year, some for more than two years. They have never required repair or attention of any kind, and work admirably. By the use of these removable dips the retorts are kept quite free from carbon, the charges burn off more quickly than before they were adopted, and the yield of gas is increased. We get regularly a weekly and monthly average yield of gas per ton of coal exceeding 10,400 feet of 14-candle gas, and I attribute this excellent result in no small degree to the use of these Self-Acting Removable Dip-Pipes.

I am, gentlemen, yours faithfully,

(Signed) EDMUND H. STEVENSON.

For terms of use and cost, apply to Mr. G. W. STEVENSON,

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THE

IMPERIAL METER COMPANY,

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MANUFACTURERS OF

"WET" & "DRY" GAS-METERS IN IRON & TIN-PLATE CASES,

STATION-METERS AND GOVERNORS, STREET-LAMP METERS, BOXES, AND REGULATORS FOR THE AVERAGE METER SYSTEM.

Attention is called to their Dry Meters in Wood Cases, as used by the principal London Gas Companies. These Meters are especially suitable for seaport towns and for export.

The Company repair or convert every description of Wet Gas-Meters to De Castro and Burton's Patent.

EDWARD E. CROMBIE & CO.,

INVENTORS AND PATENTEES

OF THE

FRICTIONLESS DRY GAS-METERS,

Beg to intimate to Gas Companies and others that they are now prepared to supply these very superior Meters at the same prices as for the ordinary Gas-Meters.

In the construction of this Meter, for which the best tin plates only are used, every mechanical contrivance has been taken advantage of successfully to reduce the friction to a minimum, which is amply proved by the fact that they are made to work upon only one-fortieth of an inch pressure. By an improvement also in their construction, a steadier light is obtained, and greater capacity than can be got from any other Meter in the market. No gas can pass under the valves on any back pressure, as is the case with many other Dry Meters.

To Gas Companies supplying gas through streets with heavy gradients, these Meters are invaluable, as much gas is saved from the low pressure required to work them.

ALL METERS ARE UPHELD FOR FIVE YEARS.

METROPOLITAN WORKS, DIANA PLACE, EUSTON ROAD, LONDON, N.W.

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Manufacturers of

IMPROVED CONSUMERS WET GAS-METERS

IN CAST-IRON CASES,

THE UNVARYING WATER-LINE GAS-METER,

AND

IMPROVED DRY GAS-METERS;

STATION-METERS OF ALL SIZES, with PLANED JOINTS;

GOVERNORS, PRESSURE AND EXHAUST REGISTERS, TEST HOLDERS.

And all kinds of Experimental Gas Apparatus.

WILLEY AND FORD,

GAS ENGINEERS,

WORKS: COMMERCIAL ROAD, EXETER,

INVITE THE ATTENTION OF GAS COMPANIES AND OTHERS FOR THE SUPPLY OF

EVERY DESCRIPTION OF GAS APPARATUS.

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NEW GAS-WORKS erected complete. Plans and Estimates furnished. MAINS, METERS, SERVICES, LAMPS, &c., adapted for Towns of any size. Gas Companies advised on Improvements, Extensions, and Alterations of Works.

GASHOLDERS AND TANKS.

RETORTS and RETORT-HOUSE FITTINGS, CONDENSERS, SCRUBBERS, ENGINES and EXHAUSTERS, PURIFIERS, STATION-METERS, GOVERNORS, VALVES, &c.

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They beg special attention to the excellence and superiority of their WET and DRY METERS, several thousand being now in use by many of the largest Gas Companies in the West of England and South Wales. Warranted to measure correctly, and not to vary. Their acknowledged superiority has brought them into general use more rapidly than any Meters hitherto manufactured. A guarantee of Five years tendered with each Meter.

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An extensive variety of Choice Designs in CHANDELIERS, PENDANTS, BRACKETS, STAR and SUN LIGHTS, MEDIÆVAL FITTINGS for CHURCHES, &c.

PATTERN-BOOKS and PRICE LISTS furnished.

☞ PLEASE NOTE THE ADDRESS—

GAS ENGINEERING WORKS, COMMERCIAL ROAD, EXETER.

It having come to the knowledge of the

Messrs. W. & B. COWAN,

OF

LONDON AND EDINBURGH,

That an attempt is being made to introduce the principle of abstracting the excess of volume given from a Wet Meter Wheel by the lowering of the water-line, by other than those to whom licences have been granted:

This is to give **NOTICE**, that all Persons thus infringing the Patent, granted on the 13th of May, 1874, to Messrs. **WARNER** and **COWAN**, will be immediately proceeded against.

MURRAY, BEITH, & MURRAY,
W.S.

43, *Castle Street, Edinburgh,*
Sept. **5, 1876.**

HENRY GREENE & SON,

GAS AND HOT WATER ENGINEERS,

155, CANNON STREET, E.C.

Manufactory: 19 & 20, NICHOLAS LANE, E.C.

SUN-BURNERS,

With Regulating Valves to obviate down draught.

MEDIÆVAL & OTHER GAS-FITTINGS

For Churches and Domestic Use.

ARCHITECTS' OWN DESIGNS WORKED OUT.

ESTIMATES FREE OF CHARGE.

THE TRADE SUPPLIED.

SOLE CONSIGNEES FOR BRÖNNER'S IMPROVEMENTS IN GAS LIGHTING.

IN THE MATTER OF

BRÖNNER'S

GAS-BURNERS.

HENRY GREENE AND SON, 155, Cannon Street, London, Sole Agents for Great Britain, Ireland, and Colonies, of Brönner's Improvements in Gas Lighting, beg to inform the public that on the 13th of January, 1876, Julius Brönner obtained an injunction in the Court of Session, Scotland, against Donald M'Vean, Gas-Fitter, 14, Newton Street, Glasgow, prohibiting him from in any way advertising or offering for sale as Brönner's Burners, any Burner not manufactured by Julius Brönner, or from in any way inducing the public to believe that the said Donald M'Vean sells or keeps for sale Brönner's Burners, manufactured by Julius Brönner, while such is not the case.

Also that on the 9th of November, 1875, he obtained injunction in the same Court, and in the same terms, against R. M. Brechin and Co., 46, North Hanover Street, Edinburgh.

Also that on the 20th of April, 1875, in a suit in Chancery, before Vice-Chancellor Malins, number 1874, B 365, he obtained injunction against another defendant, in the same terms and on similar grounds.

MESSRS. NEWTON, CHAMBERS, & CO.,

THORNCLIFFE IRON-WORKS, NEAR SHEFFIELD,

MANUFACTURERS OF

IMPROVED CENTRE-VALVES,

PURIFIERS, CONDENSERS, SCRUBBERS, GASHOLDERS, ROOFS,

And every description of Gas Machinery.

TENDERS GIVEN FOR WORK FIXED COMPLETE IN ANY PART OF THE KINGDOM.

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WORKS:

SPRINGBANK FOUNDRY & NORTH WOODSIDE FOUNDRY,

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Manufacturers of

CAST-IRON GAS AND WATER PIPES.

SIZES: ¾ to 12 inches at GLASGOW.

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A LARGE STOCK KEPT, AND PRICES MODERATE.

Freight to London, in the Stream, 10s. per ton from Stockton; 12s. 6d. from Glasgow.

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TANGYE BROTHERS AND HOLMAN,

LAURENCE POUNTNEY LANE, LONDON, E.C.,

SOLE MAKERS OF

MORTON'S PATENT SELF-SEALING

RETORT-LIDS,

WITH

HOLMAN'S NEW PATENT

BRACKETED CROSS-BARS,

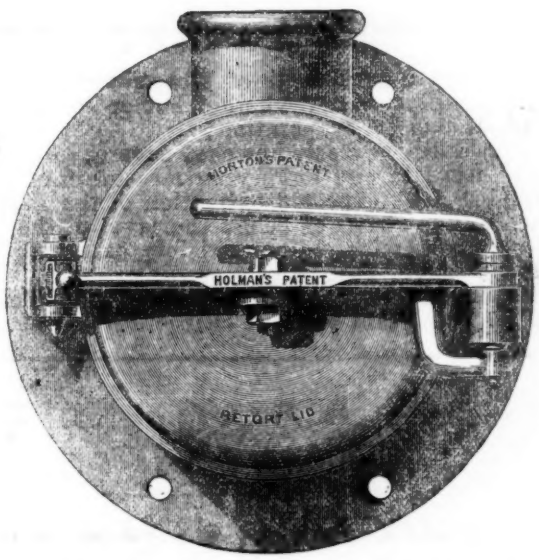
ANTI-FRICTION CATCHES, AND ECCENTRIC FASTENINGS.

NO LUTING.

NO DUPLICATE LIDS REQUIRED.

INSTANTANEOUS SEALING EFFECTED.

VERY DURABLE.



HOLMAN'S NEW SELF-SUSTAINING CROSS-BAR ENSURES FREEDOM OF JOINT, AND MAINTAINS PARALLEL POSITION OF THE LIDS.

By the employment of MORTON'S PATENT SELF-SEALING RETORT-LIDS, with HOLMAN'S PATENT ECCENTRIC FASTENINGS, the old-fashioned, cumbersome, and expensive method of sealing Retorts, by luting the lids with lime and other materials, is entirely dispensed with.

Since their introduction in 1869, these Patent Retort-Lids have been thoroughly tested, over 20,000 being in use at various Gas-Works in London and the Provinces, among which may be mentioned:—

The Gaslight Co., Beckton (where nearly 4000 are in use).
" Gaslight Co., Bow Common.
" Gaslight Co., Silvertown.
" Gaslight Co., Lupus Street.
" London Gaslight Co.
" Independent do.
" Phœnix do.
" South Metropolitan Gaslight Co.
" Commercial do.
" Imperial do.
" West Ham Gas Co.
" Gas-Works, Barnet.

The Gas-Works, Royal Arsenal, [Woolwich.
" do. Lower Sydenham.
" do. Brentford.
" Consumers Gas Co., Woolwich.
" Alliance and Dublin Gas-Works.
" Edinburgh do.
" Manchester Corporation do.
" Salford do. do.
" Rochdale do. do.
" Liverpool Gas-Works.
" Birmingham do.
" Birkenhead do.
" Nottingham do.

The Newcastle-on-Tyne Gas-Works.
" Lurgan do.
" Carmarthen Gas-Works.
" Merthyr Tydfil do.
" Windsor do.
" Leeds do.
" St. Albans do.
" Over Darwen do.
" Rotherham do.
" Aylesbury do.
" Bournemouth do.
" Ystrad do.
" Cardiff do.
" Rochester do.

The Keighley Gas-Works.
" Aberdare do.
" Ballymena do.
" Richmond do.
" Stalybridge do.
" Longton do.
" Exeter do.
" Ross do.
" Falmouth do.
" Barrow-in-Furness do.
" Belfast do.
" Wakefield do.
And other Provincial and Foreign Gas-Works.

IMPORTANT TESTIMONIAL.

The Gaslight and Coke Company (Commonly called the Chartered Gas Company), Beckton, North Woolwich, July 2, 1874.

MESSRS. TANGYE BROTHERS AND HOLMAN.

Gentlemen,—In answer to your inquiry respecting the Self-Sealing Lids, I beg to say that they continue to work well, and I have every reason to be satisfied with them.

I should be very sorry to return to the old system of Luting, and our stokers here freely acknowledge the benefit to them of the new system.

I am, yours truly,
(Signed) G. C. TREWBY.

London 1851. New York, 1853 Paris, 1855. London, 1862.

Dublin, 1865 Paris, 1867.

The SIX MEDALS AWARDED to THOMAS GLOVER for

PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

214 TO 222, ST. JOHN STREET, CLERKENWELL GREEN,

LONDON, E.C.

THOMAS GLOVER & CO.'S PATENT DRY GAS-METERS,

1st, Are a remedy for all the defects of Wet Meters;
2nd, Are suitable for all climates, whether hot or cold;
3rd, Incur no loss of Gas by evaporation;
4th, Cannot become fixed by frost, however severe;
5th, Are the most accurate and unvarying measurers of Gas;
6th, Prevent jumping or unexpected extinction of the Lights;
7th, May be fixed either above or below the level of the Lights;
8th, Cannot be tampered with, without visibly damaging the outer case;
9th, Will last much longer than Wet Meters;
10th, Will not cost more than one-half for repair that Wet or Water Meters do;
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TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, SEPTEMBER 12, 1876.

Circular to Gas Companies.

METROPOLITAN gas affairs are, for the moment, in a very quiet state. Presently, however, we shall have the half-yearly meetings of the South London Companies, and may possibly learn something with respect to the future. North of the Thames the gas interest is now almost consolidated; the greater importance, therefore, attaches to the companies in the south. What will they do? Will they combine? And if they should combine, will it be simply a southern confederation, or will the companies link hands across the water, and make the gas supply of the Metropolis a homogeneous whole? That is what not a few interested in metropolitan gas matters are now asking. A distinct answer to these questions is, of course, not to be immediately expected; but we may shortly, perhaps, be enabled to get some idea of the views of those who control the destinies of the companies.

There can be but few, we imagine, who, apart from personal interests, could be opposed to the policy of amalgamation. That the investing public regard it as advantageous is, we think, conclusively shown by the steady and continuous rise in the value of the shares of the Chartered Company, which has now reached 216–218, a price which can yield but little more than four per cent. This rise, it must be remembered, takes place in face of the fact, that under the new legislation, and after a little more than two years, present holders will no longer participate in the allotment of shares. We have shown, on former occasions, that it must be several, we might say many, years, before any perceptible effect can be produced by the introduction of non-dividend bearing capital; while the consequences of the sliding scale, *per se*, must remain doubtful, in view of another large increase in the price of coal. We come, then, to the conclusion, that it is amalgamation which has caused the public to regard the Chartered Company's shares with so much favour that they have reached a price, which, so far as we remember, has never been attained in the case of any other gas company. The fact cannot be without its influence, when the policy of amalgamation on the south side of the river is under consideration. If, as we cannot help thinking is the case, amalgamation is found to enhance the value of gas property, then a stronger argument for combination than any other has been discovered.

The report of the directors of the Crystal Palace District Gas Company, for the past half year, has been issued, and shows a very gratifying state of affairs. Full dividends have been earned, and after allotting £1000 to the reserve-fund, there is still a balance of £555 to be carried forward to next half year's account. At the meeting to be held on the 21st inst., the directors will ask the consent of the proprietors to the conversion of shares into stock. The proposal will, no doubt, receive the assent of the shareholders. We, who hold a strong opinion as to the desirability of affording facilities to small investors in gas undertakings, might raise a sentimental objection; but the advantages of the conversion of shares into stock are obvious. Nevertheless, we should like to see one genuine "consumers company."

Our readers will find, in another column, a short report of the last monthly meeting of the Manchester City Council, at which the Gas Committee of the Corporation presented their report for the past year. We have not yet received a full statement of the accounts, but the abstract before us shows that the profits of the gas undertaking amount to no less a sum than £101,232. Of this large sum only £16,185 is required to pay interest on loans, and £28,000 is applied to the liquidation of the mortgage debt. The balance, close upon £60,000, goes, it would appear, to the Improvement Department. In plain English, the gas consumers of Manchester have had imposed on them additional taxation, during the past year, to the extent of £60,000 for public improvements. Well, if they do not object, it may be argued that we have no cause to protest. Nevertheless, we do protest most strongly, in the interest of all gas consumers in towns and cities where the gas undertakings are in the hands of the local authorities. From some correspondence which has reached us, we are inclined to believe that the consumers in Manchester are becoming alive to the fact that they are overtaxed. At this moment we may roughly estimate that when the reductions now proposed by the Gas Committee are made, gas will be at least one-fourth dearer than it need be, or ought to be, if the undertaking were managed on the self-supporting principle we advocate. There ought not, at the present date, nor, indeed, for many years past, to be a shilling of debt on the undertaking, and gas might be sold for cost price. What that would be we cannot say before we see the full accounts, but we have intimated above what might be a fair and reasonable price. We shall return to the question when we have the accounts before us.

The Corporation of Salford, it will be seen, are not so fortunate with their gas undertaking. The circumstances are, indeed, in some respects, widely different. Still gas ought to be cheaper, even in Salford; but the Gas Committee profess that they do not see their way to a reduction of price, at all events at present.

An interesting question as to the payment of interest on deposits has cropped up in Manchester. It seems that security in such a form is exacted from four-fifths of the consumers, and, up to the present time, no interest has been paid on the sums deposited. The Corporation have, therefore, been gratuitously supplied with a fair working capital. But now, perhaps, the agitation in Liverpool seems to have re-acted on Manchester, and the Corporation have, we are bound to say in an ungracious spirit, agreed to pay interest on deposits for the future. While all Gas Acts, passed within the last few years, compel the companies under their operation to pay five per cent., the Corporation of Manchester strive to make it look like a favour to pay 3½ per cent. The excuse for the non-payment of interest is somewhat remarkable; it is the trouble of book-keeping; and for the same reason the Corporation will not pay on deposits held for less than a clear twelvemonth. The Acts of Parliament referred to above, make companies pay interest on sums held for six months. It will thus be seen, that depositors at Manchester are not so liberally dealt with as they would be under a gas company within the operation of a private Act. But more of this anon. While we are on the subject of deposits and interest, we may ask, though not altogether germane to our speciality, why the Corporation of Manchester should not take a lesson from the Muncipality of Paris. The latter, we have recently seen, can draw some two or three millions from the population of the City, at small interest, for public improvements. The Corporation of Manchester will presently require a large loan for the new gas-works. They will probably go to the Bank of England, and take a

lump sum, at four per cent. Why should they not take a hint from Paris, and offer bonds for small amounts, at the same rate of interest. They might empty the savings banks, but so much the better for the depositors. The objection Mr. Alderman King would raise would be, of course, the trouble of book-keeping; but, if the thrifty population of Manchester—and there must be many deserving the designation—could be induced to take an interest in the prosperity of the City, surely great benefit must result. We throw this out as a hint, which the Corporation will do well to consider.

In opposition, to some extent, to Manchester, we may consider the gas affairs of Belfast. Manchester acquired what we may call the *nuclei* of their present gas undertaking early in the century—before there was such a thing as a Corporation of Manchester, and before, we rather think, Manchester sent a representative to Parliament. We were young at the time, however, and, in the absence of documents, our memory may deceive us. Belfast, however, has only recently acquired the gas undertaking, and has paid what we may call a statutory price for the acquisition. The result was not at first altogether satisfactory, but by careful management within the last two years the Gas Committee of the Corporation have done remarkably well for the consumers, and have, by their last act, placed the undertaking on a very substantial basis. The committee found themselves with a balance of profit amounting to £21,864, and they have very wisely determined to carry £20,000 to a contingency-fund. Finding themselves in cash, and with improved prospects, the committee have resolved to reduce the price of gas 3d. per 1000 feet at once. This is as it should be. Sir John Savage, the chairman of the committee, holds sound views as to the proper mode of managing corporate gas-works. Speaking of the appropriation of the £20,000 to a contingency-fund, he remarked that "it would "suffice as well for floating capital to carry on the business, and "by the saving it would effect in interest, it would indirectly "hasten the reduction of the price of gas. He held a very strong "opinion on this point, and for his own part he would never "consent to apportion money made by gas to any other pur-"pose than cheapening the price or bettering the quality." By pursuing this policy, it will be seen that the Corporation of Belfast, who not long ago paid upwards of £386,000 for their undertaking, are able to supply gas at practically a cheaper rate than it will be supplied in Manchester. We hope the consumers in the latter city, and also in Birmingham, will make a note of the fact.

The Sunderland Gas Company are in a prosperous condition. The report of the annual meeting, which will be found in another column, shows that the directors are able to pay full dividends, and a small bonus on the original stock, in lieu of back dividends. They are also in a position to announce a reduction in price of 3d. per 1000 feet from next quarter-day. This looks extremely well. The first duty of directors is to look after the interests of the shareholders; their next is to give full consideration to the claims of their customers. We are happy to see that, at Sunderland, both these obligations are well fulfilled. The result of the sale of shares by auction possesses much interest in these days. It will be seen that each £5 share, entitled to 8½ per cent., brought an average premium of £4 1s. 2d., or upwards of 80 per cent. On the sale of 1000 shares the company thus acquire more than £4000 of non-dividend bearing capital.

The neighbouring company at Hartlepool are not quite so fortunate; but this is one of those unhappy combinations—a gas and water company; and, further, the district has suffered much more from the depression of trade than Sunderland. The dividends declared at the recent meeting were 7½ and 7 per cent., and to pay these a draw has to be made on the reserve-fund. In this case, the directors say that they have been "constrained" to reduce the price of gas. We have no doubt that better times are coming for the company. We share the opinion of the engineer, that there are already signs of a revival of trade, and early next year, at the latest, we expect that the iron-works at Hartlepool will again be in active operation.

The Leicester Gas Company, it is hardly necessary to say, continue to flourish. The directors are able to pay full dividends, and carry a considerable sum to the reserve-fund.

The Cork Gas Consumers Company find themselves in a very fair position. They can pay 8 per cent. and carry something to the reserve-fund, which is not a bad result. Into the merits or demerits of the patent process of Messrs. Still and Lane we cannot enter, for we know nothing about them. The question could easily be settled by a week's trial; but we see no advantage in the appointment of a committee to investigate past accounts, with a view to ascertain the value of the process. Our advice to the patentees is to keep their £1000, and push their process wherever they can find a market for it.

The meetings of some other companies, the proceedings at which are reported elsewhere, will be noticed next week.

Water and Sanitary Notes.

Our usual Autumn Scientific Conferences have been commenced by the meeting of the British Association at Glasgow. The excellent opening address of the talented President of the Association furnishes us, unfortunately, with but little for notice. But there are some points of interest to us. The learned Professor looks forward to the discovery of a new motive power which will supersede steam; and perhaps, though he did not mention it, to a new source of light which will supersede gas. These may be regarded as somewhat visionary notions; but a more practical suggestion was made. The atmosphere of our large manufacturing towns is appalling to people unaccustomed to it. Black clouds of smoke obscure the heavens, and where chemical and metallurgical manufactures prevail, poisonous vapours destroy the vegetation for miles around. Cannot these two evils be prevented? Professor Andrews's suggestion is an air sewer, into which the products of all furnaces shall be conveyed, and carried away to some wide plain on which one huge shaft will be erected, or to a mountain side, up which will be built a chimney sufficiently high and wide to discharge the vapours far from human habitations. The idea is grand. In imagination, we already see Glasgow and its neighbourhood chimneyless. A huge air sewer carries the emanations from all the furnaces to the foot of Ben Lomond; and the mountain, being penetrated to its centre, and a shaft sunk from the summit, a sort of Scottish Vesuvius would be made, to see which would rejoice the hearts of all Cockney tourists. The suggestion, we have said, is grand; but, unfortunately, our streets are too much honeycombed already, and we doubt whether space could be found for an air sewer. The remedies are, however, in our opinion, more simple. Smoke, for the most part, means bad stoking, and is easily prevented by mechanical appliances, and even by firemen, when they are not too lazy. Poisonous vapours from chemical and metallurgic works are condensed with ease, and, in most cases, with profit to the manufacturers. Thus we may entertain a hope that, before many years, the progress of knowledge and invention may (in the absence of a Scottish mist) give Glasgow a serene sky, without the disfigurement of Ben Lomond.

There is only one other communication made to the Association which requires notice at our hands, and that is the report of the Sewage Committee on the treatment and utilization of sewage. We have not yet a complete copy of the report, but we gather from abstracts that sewage irrigation, as practised at Romford and elsewhere, is successful in every respect but as a commercial speculation. In all other points, the results are most encouraging; but when Mr. Hope ploughs in the magnificent crops he grows, he has, of course, nothing to carry to market. We notice that the committee do not seek re-appointment. Mr. Hope's lease of Bretons Farm has expired, and the committee decided to die with it. "May "they rest in peace;" but we expect they will not.

Next month the Association for the Promotion of Social Science will meet at Liverpool. One section of the Association deals with Health and Sanitary Science, and this year will meet under the presidency of T. Hawksley, Esq. The special questions for discussion are: "1. What further legal enactments, if any, "are required with a view to arrest the spread of infectious fevers? "and how far national and municipal registration is desirable as "a means thereto? and, if so, what should be the nature of such "registration? 2. What is the best mode of making provision "for the supply and storeage of water—(*a*) in large towns such as "Liverpool and Manchester; (*b*) in groups of urban communities "of lesser size, such as exist in the manufacturing districts of "Lancashire and Yorkshire? 3. What amendments are re-"quired in the legislation necessary to prevent the evils arising "from noxious vapours and smoke?" On two of these questions the President will be able to offer most valuable opinions.

THE SPONTANEOUS COMBUSTION OF COAL.*

In another column, we publish a very able paper, by Dr. Percy and Mr. Abel, on the causes of the so-called Spontaneous Combustion of Coal. It will be seen that these eminent chemists perfectly coincide with the views expressed by many writers in the Journal of Gas Lighting, that the main, if not the sole cause, is the oxidation of the iron pyrites, always present, to a greater or less extent, in coal. That being established, it follows that pyritic coal should, for this as well as for other reasons, be excluded from stores, and should be absolutely rejected for shipment.

On one or two points we are not in accord with the writers whose paper we publish, nor with the Royal Commissioners. We believe that moist, as distinguished from wet, coals, are more liable to heat than dry coals, and we have an opinion that *thorough*

* Report of the Royal Commissioners appointed to inquire into the Spontaneous Combustion of Coal in Ships.

ventilation with dry air would be the best means of preventing combustion. This is, perhaps, unattainable in the hold of a ship, and it may be that then, the best thing to do is to exclude atmospheric air as completely as possible. The evidence on this point, given before the Commissioners, was very conflicting. It is, however, a remarkable fact, that the greater number of ships, carrying coals, which were burnt at sea, were ships said to have been ventilated. The Royal Commissioners report unfavourably of ventilation; but their reasons are not always clear. Here are two cases on which they lay some stress:—

Since this commission has been sitting, further evidence in this direction has been supplied by the vessels *Theresa* and *Anglia*. The *Theresa* (704 tons) sailed from Birkenhead for Rangoon with 920 tons of coal in September, 1875, and became a total loss from spontaneous combustion when she had been at sea a little over two months. She was very extensively ventilated, having square venetianed deal ventilators in each hatch to the keelson, and a trunk-way on each side of the keelson, and three rose mushroom ventilators in each hatch. The following is an extract from a letter from her owner, Mr. Henry French, of Liverpool:—"When I heard of the loss of the *Theresa* I had another vessel (the *Anglia*, 525 tons register, classed A.E. 1 English Lloyd's) beginning to load 630 tons of the same kind of coals for Havannah. The captain decided he would have no ventilation, and went without any. She sailed Jan. 29, 1876, and was 69 days on the passage, being 28 days before getting clear of this land. He reported his coals very hot when discharging, but no signs of fire, and the top of the coals seemed to be coated with a kind of scum like sulphur. During the voyage his hatches were kept off when practicable. I mention the above on account of the coals being from the same pit, and being just the same time on board as the *Theresa's* cargo. One ship was ventilated, the other not."

Now it seems to us extremely probable that if the *Anglia* had remained at sea another week she would have been on fire, and the evidence for and against ventilation would have been balanced.

As regards coal stores on land, however, we believe that the free access of dry air tends to reduce the chances of spontaneous combustion. In the appendix to the report, which has not been published, there is a paper by Mr. H. S. Poole, which the Commissioners say proves conclusively the injurious effects of ventilation, as applied to coal stored on shore. We shall print this paper as soon as we obtain it, and examine the facts which have brought the writer to his conclusion.

A TREATISE ON THE SCIENCE AND PRACTICE OF THE MANUFACTURE AND DISTRIBUTION OF COAL GAS.

CVIII.

Frankland and Ward's Gas Analysis Apparatus.

(Continued.)

To use the apparatus, the laboratory-vessel is placed in the trough and filled with mercury. This may be either done by applying suction at the steel cap, or, more easily, by passing a small piece of caoutchouc tubing under the mercury to the top of the laboratory-vessel, sucking out the air, and removing the small remaining quantity by suction at the cap.

The faces of the caps are greased with a little resin-cerate,* and, the whole apparatus being quite full of mercury, securely clamped together.

Before commencing the actual analysis, it must be ascertained whether the joints and stopcocks are all air-tight, and if there is a free passage through the capillary-tubes. The reservoir is lowered to the level of the table, and all the stopcocks opened; if no air enters, everything is air-tight; and if a stream of mercury passes through the capillary tubes into the eudiometer, the analysis can be proceeded with. In case of any leak, the caps may be released and freshly greased, or the cocks may be carefully ground with a little very fine rouge and caustic soda solution. Care must be taken not to carry this grinding too far, and so reduce the level of the aperture in the stopcock below that in the capillary-tube.

Stopcocks (*a* and *e*, fig. 1) are then closed, and the gas to be analyzed is passed up into the laboratory-vessel and allowed to pass over into the eudiometer by gently opening the stopcocks. When the mercury in the laboratory-vessel reaches a certain fixed point in the capillary-tube, about half way along it, the stopcock (*e*) is rapidly closed.

The mercury in the eudiometer is next allowed to fall below the division it is decided to measure the gas at, and the stopcock (*d*) closed.

The selection of this division will depend upon the quantity of gas employed, and the experiments that are to be performed with it.

The reservoir is then raised a little and the cock (*d*) gradually opened until the mercury rises so that the top of its meniscus is exactly level with the mark on the eudiometer, when the cock is quickly closed by its long handle.

The height of the mercury in the barometer-tube is then observed, and the temperature of the water in the surrounding cylinder.

The tension under which the gas is measured will thus clearly be the height of the mercury in the barometer-tube, less the height corresponding to the mark on the eudiometer at which the gas is measured. Thus, suppose the gas to be measured at mark 3, and the height of the mercury in the barometer-tube to be 862·6 m.m., then the tension of the gas is (see table):—

862·6 m.m.
754·5 „

108·1 m.m.

* Ceratum Resinæ.—B. P.

The reason why no correction has to be made for the tension of aqueous vapour has been already explained.

The gas, having been measured, is returned to the laboratory-vessel by opening cock (*d*), raising the reservoir, and then opening cocks (*a* and *e*). The reservoir must be raised sufficiently high to cause a stream of mercury to pass over from the eudiometer to the laboratory-vessel, and this must be continued during the entire absorption to mix the gas.

All absorptions are performed by means of liquid reagents. These reagents are—

(i.) A concentrated solution of caustic potash, of specific gravity about 1·9, for absorbing carbonic acid.
(ii.) A saturated solution of pyrogallic acid in water, for absorbing (with potash) oxygen.
(iii.) A strong solution of sulphuric anhydride, in Nordhausen sulphuric acid, for absorbing the heavy hydrocarbons of the series $C_n H_{2n}$.*

and occasionally—

(iv.) An acid solution of cupreous chloride, for absorbing carbonic oxide.
(v.) Absolute alcohol, &c.

The reagents are introduced, as required, into the laboratory-vessel by small pipettes with curved points (see fig. 6), a few drops being usually sufficient. A little mercury is kept in the bend, *a*, to prevent the escape of the reagent when the pipette is not in use.

Fig. 6.

After the absorption, which usually occupies about seven minutes for potash and ten minutes for pyrogallate of potash, the gas is returned to the eudiometer and again measured. The reagent must be carefully stopped at the mark on the capillary-tube of the laboratory-vessel before referred to. If any of the reagent, by an accident, be introduced into the eudiometer, the laboratory-vessel must be removed and the eudiometer washed, first, with a little very dilute sulphuric acid (which ought to give an acid reaction to litmus paper after leaving the eudiometer), and then with distilled water for several times.

As a general rule, the gas can be measured at the same mark on the eudiometer—*i.e.*, at the same volume throughout an analysis. This is a great saving of calculation, as then the tensions under which the gas is measured at different times are directly comparable as volumes.

Generally, too, the water-jacket remains at the same temperature throughout an analysis, thus eliminating all calculations for difference of temperature. But when its temperature varies it will be found best to reduce all the volumes to 0° C., by means of the following formula derived from Charles's law.

$$Vo = \frac{Vt}{1 + \alpha t}$$

Where Vo and Vt = the volumes at 0° and t° C. respectively, and α the co-efficient of expansion of gases from 0° to 1° C. (= 0·003665).

Tables may be found in most books on gas analysis giving the value of $(1 + \alpha t)$ for every 1-10th of a degree from 0° C. upwards, and its logarithmic expression. The following is a short extract from such a table:—

Temperature (C).	$1 + \alpha t$.	Log.
0·1°	1·0003665	0·0001589
0·2°	1·0007330	0·0003182
0·3°	1·0010995	0·0004775
0·4°	1·0014660	0·0006362
&c.	&c.	&c.

For explosions the proper quantity of oxygen or hydrogen, as the case may be, must be added, and the gas expanded in the eudiometer, so as to diminish the force of explosion. The syphon-tube (D, fig. 1) is then depressed, so as to lower the water in the surrounding cylinder. When this water is below the wires, the stopcocks being all closed, a spark is passed between the platinum wires by an induction-coil. The noise of the explosion ought to be heard as a distinctly audible click, and the flash should be visible. If the flash is only pale blue and hardly discernible, complete combustion has not taken place. The syphon is then raised, and the gas can be immediately measured.

The quantity of O or H to be added depends upon the nature of gas or gases present. Thus, for—

(i.) Hydrogen
or
(ii.) Carbonic oxide } One and a half times its volume of oxygen.
(iii.) Marsh gas . . Four times its volume of oxygen.
(iv.) Oxygen. . . Three times its volume of hydrogen, &c.

In all cases, a large excess over the theoretical quantity is necessary to ensure complete combustion, and to diminish the force of explosion.

With the proportions given above, the explosions may be performed under a pressure of 300 to 400 m.m.; but it is found that, by diminishing the excess of gas that is added, the same degree of safety, as to complete combustion and preservation of the eudiometer, may be

* This reagent is made by distilling the sulphuric anhydride from about four ounces of Nordhausen acid into one ounce of the same. The distillation must be continued until the acid in the retort turns white, and then almost immediately stopped, or $H_2 SO_4$ will distil over. The acid so obtained must remain liquid at all temperatures, and fume very strongly when exposed to the air. If it solidifies on cooling, it is not strong enough, and more anhydride must be distilled into it. It must be kept in bottles, of which the stoppers have been carefully ground with washed emery, or it soon spoils by attracting moisture from the air. The manner of using this reagent is explained under the example of an analysis of coal gas. (See sequel.)

obtained if the pressure under which the explosion takes place be lessened.

For example, we may explode one volume of hydrogen with one volume of oxygen under a pressure of about 200 m.m., and obtain just as good results as if we used the larger quantity of oxygen and the greater pressure.

In a short memoir of this kind, the details of the proportions and pressures that are requisite for each other, with varying mixtures of gases, cannot be entered into, but under the example of an analysis of coal gas, those for that special part are given.

Care must be taken not to explode at too great a pressure, as, if the eudiometer be not fractured, some of the mercury may be volatilized, and so adhere very tenaciously to the sides of the tube. Should the latter happen, the deposit is best removed by washing the inside of the tube first with a solution of caustic potash, then with dilute sulphuric acid, and lastly with water. Indeed, this method may be generally adopted for cleaning the eudiometer.

The following is the method usually followed for a complete analysis of a sample of coal gas with this apparatus:—

The constituents of the gas that are estimated are carbonic acid, oxygen, heavy hydrocarbons absorbed by fuming sulphuric acid (the $C_n H_{2n}$ series), hydrogen, carbonic oxide, marsh gas, and nitrogen. The other components of the gas are in too small quantities, in ordinary gas, to be determined in this manner.

The apparatus being quite full of mercury, and air-tight, the laboratory-vessel is about one-third filled with the gas to be examined.

This is transferred to the eudiometer, and measured at one of its marks, whichever most convenient (say mark 3 or 4), taking at the same time the temperature of the water-jacket. Call this Vol. I.

The gas, having been measured, is returned to the laboratory-vessel, and a few drops of potash solution passed up into it. After this reagent has been in contact with the gas for about five or seven minutes, the mercury dropping over from the eudiometer all the while, the gas is to be again measured. Call this Vol. II.; it is the gas less any carbonic acid it may contain.

After measuring, the gas is again returned to the laboratory-vessel, and a few drops of pyrogallic acid solution introduced. This, with the potash already present, forms pyrogallate of potash, which rapidly absorbs oxygen. After about ten minutes the gas is measured; it has now lost its carbonic acid and oxygen. Call this Vol. III.

The gas is now to be returned to the eudiometer, and stopcock (*a*, fig. 1) carefully closed. When this has been done, the laboratory-vessel is removed, cleaned, and returned to its position quite full of mercury. As there is usually a little loss of gas during this operation, the gas must be measured again. (Vol. IV.)

The heavy hydrocarbons are next to be removed. These are absorbed by the fuming sulphuric acid before referred to. The acid is introduced on small coke bullets, not with the pipettes used for the other reagents. These bullets are made by heating a mixture of powdered bituminous coal and coke driven hard into a bullet-mould with its handles fastened together. The mould with its contents is first slowly heated to redness in a Bunsen burner, and then to bright redness for ten or fifteen minutes in a gas blowpipe. After allowing it to cool, the bullet can be easily removed from the mould. A piece of platinum wire fixed in the mixture of coal and coke before heating serves as a handle. The bullet is introduced into the laboratory-vessel by a piece of bent glass tubing, through which the platinum wire is passed.

When all is ready, the bullet is dipped about half-way into the acid, and allowed to soak until it is completely moistened, which usually occupies about half a minute. It is then rapidly removed and pushed up under the mercury into the laboratory-vessel by aid of the piece of glass tubing and platinum wire.

The introduction of air with the bullet or through the tube must, of course, be carefully guarded against. The bullet must be thoroughly saturated with the acid; any dry part in it will absorb other gases, and so introduce errors into the results.

The gas must remain in contact with the acid for at least an hour, after which the bullet may be removed.

The volume of the gas will now be probably larger than it was before the acid was introduced into it. This is due to sulphurous acid and carbonic acid gases which have been produced. They are removed by a little potash together with the excess of the acid. The gas may then be transferred to the eudiometer and measured. Call this Vol. V.

After measurement, the laboratory-vessel is to be again withdrawn and cleaned.

The gas, which now consists of hydrogen, carbonic oxide, marsh gas, and nitrogen, must be reduced in volume before proceeding further. The reservoir is raised just above the top of the eudiometer, and stopcock (*a*, fig. 1) gently opened, the laboratory-vessel being removed for cleaning. When about one-third only of the gas remains in the eudiometer, the cock (*a*) is closed and the laboratory-vessel clamped on.

The remaining gas having been first measured (Vol. VI.), it is returned to the laboratory-vessel, and there mixed with about three times its own volume of pure oxygen gas. The laboratory-vessel is roughly divided into equal parts by scratches upon it, so that the proper quantity of oxygen to add may be roughly ascertained. The gases are mixed by allowing mercury to stream over from the eudiometer for a few minutes.

The gas thus mixed with oxygen is then returned to the eudiometer and measured. (Vol. VII.) Before exploding, it is well to calculate the quantity of oxygen that has been added; if there is any great discrepancy from the quantity indicated above, the analysis had better be discarded.

The pressure under which the gas is to be exploded is about 300–320 m.m. of mercury, according as less or more oxygen than the theoretical quantity has been added. This means that the mercury in the barometer-tube must be 300–320 m.m. higher than that in the eudiometer. All the stopcocks being closed, the syphon is lowered, and when the water falls below the wires in the outside cylinder, the mixture is exploded by a spark from the induction coil. After the explosion the syphon is raised, and the gas immediately measured. (Vol. VIII.)

A certain quantity of carbonic acid has been produced by this explosion. Its volume must be estimated by placing the gas in contact with potash in the laboratory-vessel for a few minutes, returning it to the eudiometer, and again measuring it. (Vol. IX.)

The residual gas now consists of the nitrogen present in the original gas, and the excess of oxygen added for explosion. This excess of oxygen is determined by adding about three times its volume of pure hydrogen gas, and then measuring. (Vol. X.) This mixture is then exploded under a pressure of 220–240 m.m. of mercury, and afterwards again measured. (Vol. XI.)

We have now all the data for calculating the per centages of the seven different gases mentioned above. To begin with the carbonic acid. This is clearly the difference between the original gas (Vol. I.) and the gas after submitting it to the action of potash. (Vol. II.) Next, the oxygen, in the same manner, is the difference between Vol. II. and Vol. III.; and the heavy hydrocarbons are similarly the difference between Vol. IV. and Vol. V. These, of course, represent the relative proportions of these constituents in the gas employed. Their per centages may be found in the usual manner.

With regard to the nitrogen, we found that Vol. IX. (*i.e.*, the gas after explosion and less carbonic acid) consists entirely of the excess of oxygen and the quantity of nitrogen originally present. This excess of oxygen is easily found from the contraction produced in the explosion afterwards with hydrogen. It is, in fact, one-third of this contraction. If, therefore, we take one-third of the difference between Vols. X. and XI., and deduct this from Vol. IX., we shall have the quantity of nitrogen present in the gas employed after the removal of the carbonic acid, oxygen, and heavy hydrocarbons—viz., Vol. VI.

This does not give the per centage of the nitrogen, which must be found in a different manner from the preceding three, as will be afterwards explained.

It now remains to calculate the amounts of hydrogen, carbonic oxide, and marsh gas present. These amounts may be found from—

(i.) The contraction produced by explosion with excess of oxygen.
(ii.) The amount of oxygen employed by this combustion.
(iii.) The amount of carbonic acid produced on complete combustion.

It will be found more convenient to use (i.) and (iii.), as the formulæ are simpler. If we take the three gases, and examine what contraction takes place when equal volumes of them are exploded with an excess of oxygen, we find that—

(α.) Hydrogen contracts $\frac{3}{2}$ of its volume.
(β.) Carbonic oxide „ $\frac{1}{2}$ „ „
(γ.) Marsh gas „ 2 „ „

Again, the relative quantities of carbonic acid produced by such combustion are—

(α.) Hydrogen, none.
(β.) Carbonic oxide, its own volume.
(γ.) Marsh gas, its own volume.

Now let A = the entire volume of the three gases.
C = the contraction produced on explosion of the mixture.
D = the carbonic acid produced by the explosion.
Also x = Hydrogen.
y = Carbonic oxide.
z = Marsh gas.

Then from the above data we may construct the three following equations:—

$$x + y + z = A \quad \ldots\ldots \quad (1.)$$

$$\frac{3x}{2} + \frac{y}{2} + 2z = C \quad \ldots\ldots \quad (2.)$$

$$y + z = D \quad \ldots\ldots \quad (3.)$$

Whence—

$$x = A - D \quad \ldots\ldots \quad (4.)$$

$$y = \frac{3A - 2C + D}{3} \quad \ldots\ldots \quad (5.)$$

$$z = \frac{2C - 3A + 2D}{3} \quad \ldots\ldots \quad (6.)$$

And since A, C, and D are all known, we can easily find the quantities of these gases in the volume employed. (Vol. VI.)

The per centages of these gases, together with that of nitrogen, may now be found. Let the volume of gas employed, less the carbonic acid, oxygen, and heavy hydrocarbons (Vol. VI.) be represented by α, and the sum of the per centages of carbonic acid, oxygen, and heavy hydrocarbons by β. Then the per centage of hydrogen will be $\frac{x(100 - \beta)}{\alpha}$, and so for the others, substituting for x the quantities of the different gas respectively present in A.

The following is an example of an actual analysis, which will illustrate the method better than any description:—

	Millimètres.
VOL. I.—*Gas Employed.*	
Height of mercury in barometer-tube . . .	755·0
Do., corresponding to mark 4 on eudiometer .	654·5
Tension of gas	100·5
Temperature, 15·1° Cent.	
Tension of gas reduced to 0° Cent., 95·23.	
VOL. II.—*Gas, less Carbonic Acid.*	
(Measurements precisely as for Vol. I.)	
Therefore, tension of gas at 0° Cent., 95·23.	
VOL. III.—*Gas, less Carbonic Acid and Oxygen.*	
Height of mercury in barometer-tube . . .	754·4
Do., corresponding to mark 4 on eudiometer .	654·5
Tension of gas	99·9
Temperature, 15·1° Cent.	
Tension of gas reduced to 0° Cent., 94·66.	
VOL. IV.—*Gas, after Cleaning and Replacing Laboratory-Vessel.*	
Height of mercury in barometer-tube . . .	754·2
Do., corresponding to mark 4 on eudiometer .	654·5
Tension of gas	99·7
Temperature, 15·2° Cent.	
Tension of gas reduced to 0° Cent., 94·53.	
VOL. V.—*Gas, less Heavy Hydrocarbons of the Series* C_nH_{2n}.	
Height of mercury in barometer-tube . . .	750·2
Do., corresponding to mark 4 on eudiometer .	654·5
Tension of gas	95·7
Temperature, 15·3° Cent.	
Tension of gas reduced to 0° Cent., 90·62.	
VOL. VI.—*Gas, after Cleaning and Replacing Laboratory-Vessel, and Reducing in Volume.*	
Height of mercury in barometer-tube . . .	685·7
Do., corresponding to mark 4 on eudiometer .	654·5
Tension of gas	31·2
Temperature, 15·4° Cent.	
Tension of gas reduced to 0° Cent., 29·54.	
VOL. VII.—*Gas, with Excess of Oxygen for Explosion.*	
Height of mercury in barometer-tube . . .	783·0
Do., corresponding to mark 4 on eudiometer .	654·5
Tension of gas	128·5
Temperature, 15·4° Cent.	
Tension of gas reduced to 0° Cent., 121·63.	
VOL. VIII.—*Gas, after Explosion with Excess of Oxygen, under a Tension of* 310 *Millimètres.*	
Height of mercury in barometer-tube . . .	734·4
Do., corresponding to mark 4 on eudiometer .	654·5
Tension of gas	79·9
Temperature, 15·4° Cent.	
Tension of gas reduced to 0° Cent., 75·63.	
VOL. IX.—*Gas, less Carbonic Acid, produced by Explosion.*	
Height of mercury in barometer-tube . . .	720·8
Do., corresponding to mark 4 on eudiometer .	654·5
Tension of gas	66·3
Temperature, 15·3° Cent.	
Tension of gas reduced to 0° Cent., 62·78.	
VOL. X.—*Gas, with Excess of Hydrogen for Second Explosion.*	
Height of mercury in barometer-tube . . .	938 0
Do., corresponding to mark 4 on eudiometer .	654·5
Tension of gas	283·5
Temperature, 15·4° Cent.	
Tension of gas reduced to 0° Cent., 268·35.	
VOL. XI.—*Gas, after Explosion with Excess of Hydrogen, under a Tension of* 210 *Millimètres.*	
Height of mercury in barometer-tube . . .	742·3
Do., corresponding to mark 4 on eudiometer .	654·5
Tension of gas	87·8
Temperature, 15·4° Cent.	
Tension of gas reduced to 0° Cent., 83·01.	

(*To be continued.*)

PRICE OF GAS AT SALFORD.—At the monthly meeting of the Salford Town Council on the 6th inst., a recommendation was brought up from the Gas Committee, to the effect that contracts be entered into for the purchase of 119,000 tons of coal, cannel, &c., at a cost of over £80,000, the contracts extending for a period of three years. After considerable discussion, the matter was referred to the General Purposes Committee. Mr. Ellis asked whether there was any probability of the price of gas in Salford being reduced, as in Manchester. Mr. Sharp, chairman of the committee, said there was no probability of the price of gas being reduced at present.

Correspondence.

ROWLAND'S STOKING MACHINERY.

SIR,—Although the work of drawing and charging gas-retorts by machinery has engaged the inventive powers of gas and other engineers for many years, both in this country and America, nothing worthy of confidence has been, till lately, introduced—on our side of the water, the Hydraulic Stoker, by Mr. W. Foulis; and on the other, the Pneumatic Stoker, by Mr. T. F. Rowland, compressed air being the medium for actuating the apparatus within the retort-house, the steam power being outside, hence the name. These two plans will soon be on their trial, as to drawing and charging D retorts, as Messrs. Tangye Brothers and Holman are making arrangements for working part of a house at Beckton with the Foulis machine, and Mr. Rowland is erecting his own machines at the New York Gas-Works. A writer in the *New York Times* of July 31, 1876, describing the machinery hall at the Centennial Exhibition, says:

There is a very beautiful working model exhibited by Mr. T. F. Rowland, of the Continental Works at Greenpoint, Brooklyn, N.Y. It represents the vast charging chamber of one of the largest gas companies of New York, with all the machinery and apparatus for carrying out the process, as constructed and placed in position by Mr. Rowland. The model shows a large rectangular building, some three or four times as long as it is broad. Running along the building, at a midway elevation, a railroad, supported on one side by heavy cast-iron pillars, and on the other side by iron stanchions let into the brick face of the furnace wall, carries a travelling platform, on which the working machinery in part rests, and from which it is in part suspended. At one end of the railroad is a large elevator and hopper, by means of which the coal is brought up from below and distributed into buckets, which carry it to the feed hopper of the charging apparatus. These buckets, eight in number, are attached at regular intervals to two endless bands, which run suspended from an upper railroad, and as they come round to the shoots of the elevating hopper, a double cam, on the stationary shaft on which the wheel carrying the bands revolves, regulates the charging of the buckets by the hopper. As the buckets reach the hopper of the charging apparatus, the arm of the spring valve at the bottom is caught by a dog, kept in position by a balance-weight, the valve immediately falls, and the bucket discharges its contents into the hopper. Passing round, the arm of the valve is caught by another dog, which, acting in a contrary direction, closes the valve and prepares the bucket for another charge. The whole construction of the railroads, framework of the elevator and hopper, &c., is of solid wrought iron, and it is surprising to witness the precision with which the automatic working of the dogs and valves is carried on. No one could be up there to look after them, so they have to look after themselves; and they do it very thoroughly and effectually. Each bucket reaches a shoot of the elevating hopper precisely at the moment that a semi-cylinder, which is at the bottom of the shoot and holds the charge of a bucket, is upset by the action of the cam. Being filled, it passes, without stopping, along the endless band, to which it is attached, to the feed hopper, and discharges its load. The feed hopper is exactly over the charging apparatus, and as soon as the hopper holds sufficient fuel for a charge, work begins. The entire machinery for feeding the charge into the retorts, hauling out the coke, and clearing the retorts, is worked under the government of two clutches, and two levers with certain concerted actions; a 25-horse power engine furnishes the requisite motive power. By throwing in clutch No. 1, gearing is set in motion, governing a revolving shaft at the bottom of the feed hopper, the shaft being cylindrical, with an open cut in it. This cylindrical shaft turning drops the fuel into the charger, and the moment the charger has received its proper amount of fuel, a heavy dog on the main spur-wheel catches an eccentric, and the machinery is thrown out of gear. Thus the filling of more than the exact set charge is prevented, though the charge can, of course, be set to any quantity. By throwing in lever No. 1, and leaving both the clutches out, the charger, which is funnel-shaped, to fit the retort, and has a false bottom, works forward, and passes bodily into the retort. By throwing both the clutches in, the moveable bottom is drawn out, and then, by throwing out the lever, the charger itself is drawn out—of course, leaving the charge behind. Similar machinery, governed by the clutches and lever No. 2, sends the scraper into the next retort, to withdraw the coke and clear it out, a rack raising it as it passes in, and lowering it when in, so as to withdraw the coke. The traveller carries both charger and scraper to all the retorts on one tier, but, by means of a pillar-screw, the charger is lowered to all the lower retorts, taking tier after tier. The scraper is worked up and down to the lower retorts by its own elevating and depressing rack.

Believing that the above particulars will be interesting to your readers, I shall be glad if you will give insertion to this communication.

M.

BARNET GAS COMPANY'S ACCOUNTS.

SIR,—In your comments, in the JOURNAL of the 5th inst., on the meeting of the shareholders of the Barnet Gas Company, you refer to the observations of a Lancashire shareholder, as absurdly comparing the prices of coal at Bolton or Wigan with Barnet.

Now, as Mr. Flitcroft, in his remarks at that meeting, referred to some statistics furnished him by me, I wish to state, in self-defence, that I did not give him the price of coal here, nor did I institute a comparison between Barnet and Bolton.

I compared the general results of Barnet with those of the metropolitan gas companies, and showed that the Barnet accounts would compare favourably, in the expenditure and receipts, with the average of them, but that the capital employed was high in proportion, and the receipts for ammoniacal liquor were ridiculously small.

As it may interest you to have the memorandum I supplied to Mr. Flitcroft, I enclose it with this.

I may state that the cost per ton of coals here for the past year has been 18s. 2d.

HARRISON VEEVERS.

The Bolton Corporation Gas Department, Sept. 8, 1876.

Memorandum on the Barnet Accounts.

On comparing the gas account of the Barnet District Gas and Water Company for the half year ending the 30th of June last, with the latest published accounts of the Metropolis Gas Companies, I find that they cannot be said to contrast unfavourably on the whole, though, as I will afterwards show, they do in two details.

As the Barnet balance-sheet does not give the quantity of gas made or sold, I must take what it does give—namely, the quantity of coal used in the manufacture of gas—as a basis of comparison.

In the year 1875 the average of the Metropolis Gas Companies expenditure per ton of coal used was £1 13s. 7·88d., and of Barnet, for the above half year, it was £1 14s. 9·19d. The average of the Metropolis gas companies total income per ton of coal used was £2 5s. 10·27d.; of Barnet, for the above half year, was £2 16s. 6·9d.

The revenue (with the exceptions to be afterwards mentioned) appears fairly

reasonable; but the amount of capital employed seems to be altogether disproportionate. The average capital employed by the above companies is £7 6s. 3d. per ton of coal used. The highest is the largest gas company, The Gaslight (£8 10s. 2d.), the lowest is the Independent (£4 1s. 7d.); and the smallest company, the Rateliff, is only £5 8s. 4d., whilst the Barnet capital employed on the gas department of the company is £22 1s. 5d.

In glancing over the revenue account, one is struck by the very small amounts of receipts for tar and liquor, particularly of the latter. Whilst the average receipts of the Metropolis companies for tar is 25·86d. per ton of coal, the Barnet is 17·94d.; but for ammonia, whilst the average of the above companies is 17·85d., the amount for Barnet is ·03 of a penny, or the three hundredth of a penny. (Bolton is for tar 22d., and liquor 17·3.)

According to the proportion of the yield of tar by the metropolitan companies, Barnet ought to produce 182 butts of liquor instead of 33, and of tar 13,000 gallons instead of 9732.

The revenue account of each half year ought to have credit for the value of everything manufactured during that time, whether sold or in stock. The revenue account is not simply a cash account, but is an account of business done, and the value of stock should be taken.

Legal Intelligence.

HIGH COURT OF JUSTICE.—CHANCERY DIVISION.

TUESDAY, SEPT. 5.

(*Before Justice* FIELD, *sitting as Vacation Judge.*)

THE ATTORNEY-GENERAL AND NUNEATON LOCAL BOARD OF HEALTH *v.* THE GENERAL SEWAGE AND MANURE COMPANY, LIMITED.

In 1872 the Nuneaton Local Board of Health were restrained by the riparian owners from pouring the sewage of the town into a certain stream, and they (the board) consequently applied to the defendant company to work the sewage for them on certain conditions, one of which was that no sewage was to be poured into the stream, the riparian owners of which had obtained the previous injunction. In March of the following year a lease of land, on which to work the sewage, was granted to the company, and this lease contained a proviso for re-entry by the board on the breach of the conditions therein stated, among which was one as to the company not discharging sewage into the stream. A short time ago the board, finding that the company were pouring sewage matter into the stream, and that they themselves were becoming liable under the previous injunction, moved for a sequestration order against the company. The judge in whose court the action was set down ordered the motion to stand over, but gave leave to the board to re-enter into possession of the land, and carry on the works as they might think fit. The company, however, were ordered to be wound up in August last, on the petition of Lord Elibank, and the board were thus prevented from continuing the works or remaining in possession.

This was an application under the 87th section of the Companies Act, 1862, for leave for the board to take possession and work the sewage.

Mr. W. PEARSON, Q.C., and Mr. METHOLD appeared for the local board; and Mr. HUNTER for the company.

His LORDSHIP granted the application.

BRIGHTON BOROUGH POLICE COURT.—WEDNESDAY, SEPT. 6.

UNLICENSED STORING OF PETROLEUM.

Mr. *A. P. Rose*, of North Street, hosier, was summoned by the municipal authorities for keeping more than a pint of petroleum on his premises without having a licence.

Mr. J. A. FREEMAN, Town-Clerk, supported the prosecution; and Mr. J. C. PENFOLD appeared for defendant, who pleaded "Guilty" to the specific charge.

The investigation went to show that defendant had been induced to purchase an apparatus for securing a better illuminating power to the gas supplied from the companies. The instrument was in the form of a cylinder, and was filled with a certain substance, which had to be connected with the gas-meter furnished to each house, in such a manner as to cause the gas consumed to come into contact with its contents; and it was claimed by the patentees of the machine that, when treated in this manner, the gas, besides furnishing a greater amount of illumination, gave off less heat, and effected a saving of 25 per cent. on the gas account. The instrument was supplied to Mr. Rose at a cost of some £4, and was supposed, according to the vendors account, to contain "vegetable carbon." The advantages claimed for it appear to have been realized, for the superior illumination of Mr. Rose's premises attracted the attention of other tradesmen, and eventually came to the knowledge of the authorities, who, on going to inspect the apparatus, found it fixed within a short distance of an open grating, and its contents to be highly inflammable petroleum, flashing at 55° Fahr. The apparatus had a capacity of six gallons, and its exposure in such an unprotected situation was, therefore, attended with the greatest risk.

Mr. *Rose*, through his solicitor, now denied the slightest knowledge of the contents of the cylinder; and, under the circumstances, asked the bench to take the most lenient course in dealing with the case.

Mr. FREEMAN did not press for a heavy penalty; but pointed out that the matter was of the utmost importance to the town, as, for aught they knew, any number of these machines might be in use about Brighton, and, from their innocent appearance, might be subjected to such treatment as would ultimately result in some dire catastrophe. It was hoped that, through the press, tradesmen would be put upon their guard, and that the use of the machines would be discontinued.

Mr. PENFOLD said his client had been quite misled in the matter. In a circular furnished by the firm, not a word was said as to the dangerous character of the article; in fact, it went so far as to say that any servant was fully competent to replenish the machine.

The MAGISTRATES considered that the matter had been brought before them most properly; but, in view of defendant's statements, they would only order a nominal penalty—namely, 1s. and costs.

The machine was forfeited.

TUNBRIDGE WELLS PUBLIC LIGHTING.—At the meeting of the Improvement Commissioners, on the 6th inst., the Police Committee reported that they had again had under their consideration the subject of the future lighting of the public lamps, and they recommended that a contract for lighting the same with gas for the next two years be entered into with the gas company, the consumption of gas to be by meter indication, as provided by the Tunbridge Wells Gas Act, 1875—viz., an average of one meter to twelve lamps, at 4s. 2d. per 1000 cubic feet, the gas company to provide columns and lanterns, and to light, extinguish, clean, paint, and repair the same at a cost of 18s. 6d. per lamp per year. The committee estimated the cost of thus lighting the lamps, including the moonlight nights, on which the lamps are not, under the present contract, lighted, at £2374 12s. 10d. per year, being £72 16s. 2d. less than the gas company offer to light them for, including the moonlight nights, and £295 5s. 10d. more than the lighting costs under the present system. The recommendation of the committee was adopted, it being left to them to consider whether it was desirable to effect a saving of expense by extinguishing the lamps at twelve o'clock, for seven months during the year, at the full of the moon.

Miscellaneous News.

HARTLEPOOL GAS AND WATER COMPANY.

The Annual General Meeting of the Shareholders of this Company was held on Thursday, the 31st ult.—Mr. T. R. HOLMES in the chair.

The following report and accounts were presented:—

In presenting the statement of accounts for the year ending June 30 last, your directors regret to have to report that the depressed condition of the iron trade, and the consequent stoppage of some of the largest works in your district, there was a considerable decrease in the consumption of both gas and water during the past year; they have also to state that they felt themselves constrained, in answer to repeated applications for that purpose, to reduce the price of gas to the extent of 3d. per 1000 cubic feet.

The balance available for division is £13,652 10s. 8d., out of which your directors recommend the payment of a dividend for the last half year at the rate of 7½ per cent. per annum on the A and B shares, and at the rate of 7 per cent. per annum on the remaining paid-up C capital of the company, in both cases less income-tax. Your directors, however, have to intimate that, for the reason above stated, this dividend has not been earned, and that the payment thereof involves an appropriation of upwards of £1300 of the balance carried forward from previous years earnings.

The works of the company are in a satisfactory condition, as will be seen from the following report of the engineers, which your directors have to supplement by advising you of the purchase (in view of future extensions) of eight acres of land contiguous to your works at West Hartlepool:—

"*To the Directors of the Hartlepool Gas and Water Company.*

"*Leeds, Aug.* 4, 1876.

"Gentlemen,—We have the satisfaction of being able to report that the embankment at Hurworth Burn has been raised to its full height, and the works for the enlargement of the reservoir are approaching completion.

"The stoppage of some the largest iron-works in the district, and the depressed condition of trade generally, have occasioned a material reduction in the consumption of soft water during the past year, which has given us the opportunity of deepening the principal reservoir, and thus increase its storeage capacity. The result of this will be to place the company in a better position than before to satisfy the demands of the manufacturers for soft water, when the long-desired revival of the iron trade shall have restored prosperity to the district.

"At the pumping station two new boilers have been provided, and the engines compounded and otherwise improved, with material advantage in economizing the cost of working.

"The several works of the company are now in a satisfactory condition.

"We have the honour to be, gentlemen, your most obedient servants,

"MARTIN AND FENWICK."

Dr. *Gas Revenue for the Year ending June 30, 1876.* *Cr.*

Water, coals, lime, & leading.	£4,735	16	4	Gas sold, rent of meters, &c.	£16,740	3	6
Wages	1,551	19	2	Residual products—			
Repairs, new retorts, &c.	2,623	3	9	Coke	1,526	7	4
Salaries and office expenses	958	4	6	Tar and ammonia	1,321	13	1
Rents, rates, taxes, and insurance	304	17	11	Sundries	16	19	10
Incidentals	16	18	2	Rents received	127	13	3
Law charges	29	0	3				
Directors	149	0	0				
Bad and doubtful debts	383	1	8				
Bank charges, interest, &c.	364	13	6				
Interest on gas deposits	20	5	6				
Interest on loans, proportion	680	18	2				
Gross profit this year	7,934	18	1				
	£19,732	17	0		£19,732	17	0

Dr. *Water Revenue for the Year ending June 30, 1876.* *Cr.*

Coals, cartage, and gas	£593	19	9	Water sold, rent of fittings and meters	£9,154	1	6
Wages	316	19	11	Rents received	85	0	0
Repairs, &c.	982	9	2				
Salaries and office expenses	786	1	2				
Rents, rates, taxes, and insurance	533	6	8				
Incidentals	32	3	10				
Law charges	36	8	9				
Directors	159	0	0				
Bad and doubtful debts	320	7	5				
Interest, bank charges, &c.	364	13	6				
Interest on loans, proportion	680	18	1				
Gross profit this year	4,432	13	11				
	£9,239	1	6		£9,239	1	6

Dr. *Profit and Loss Account.* *Cr.*

Sept. 9, 1875—				July 1, 1875—			
Dividend paid	£8,422	19	8	Balance	£14,590	11	8
March 2, 1876—				June 30, 1876—			
Dividend & income-tax paid.	6,966	9	10	Gas profit this year	7,934	18	1
June 30, 1876—				Water profit this year	4,432	13	11
Balance available for dividend	13,652	10	8	Gas and water fittings	83	16	6
	£27,042	0	2		£27,042	0	2
				July 1, 1876—			
				Balance brought down	£13,652	10	8

The CHAIRMAN, in moving that the report be approved and adopted, and a dividend be declared as recommended therein, said the directors were sorry they were not in a position to present a more favourable balance-sheet, and declare a larger dividend; but, under the adverse circumstances of the district, he thought the shareholders had reason to be congratulated, for matters might have been very much worse. The directors had had a good deal of discussion as to the amount of dividend which they would be justified in recommending, and had at last decided on declaring 7½ per cent. on the A and B shares, and 7 per cent. on the remaining paid-up C capital. In order to do that, they had had to dip into the reserve-fund, to the extent of something like £1300. They hesitated to draw more heavily on that fund lest trade should continue to be bad.

Mr. WADDINGHAM said he looked upon the report as a gloomy one. The dividend the shareholders were about to receive, it appeared, had not all been earned. Yet there was an increased capital of £40,000 during the past year, which they would have to pay interest on, and their revenue had been reduced by £2900. If this kind of thing went on, whence were they to draw their dividends?

The CHAIRMAN: We hope trade will revive.

Mr. WADDINGHAM said he drew attention to this because of the enormous capital acquired by the company. Next to having too little money, he thought it was the greatest misfortune that could befall any company to have an overgrown capital. He had been connected with several concerns which were ruined by an excess of capital. £141,000 invested in water-works seemed unnecessarily large, compared with the per centage earned in this department. He trusted the directors would see the wisdom of reducing their expenditure, and avoiding the outlay of a single shilling unnecessarily, as any one conversant with the state of trade in the North of England must see that matters were getting worse instead of better.

The CHAIRMAN said when the company took additional land at Hurworth Burn, trade was more prosperous, and it was then impossible to supply the requisite quantity of soft water. Had they not stepped in, some rival company might have been started, but now they would be prepared for an increased demand when trade revived.

Mr. FENWICK (the engineer) said he did not take the same gloomy view, but rather thought the company were to be congratulated on their present position.

He was quite sure there would have been great surprise throughout the district if they had been able this year to declare a dividend of 10 per cent. on the original shares. The company were almost entirely dependent on the prosperity of the local iron-works, and, owing to the great depression in trade, it had been found impossible honestly to pay the maximum rate of dividend on the shares. Had the directors not exercised a wise discretion, there would have been general dissatisfaction amongst the consumers. They would have complained that the company were getting more than they should, and they would have been urged to pull down their prices. But what was the fact? There was scarcely an undertaking in the kingdom that was paying better. They had been obliged, they were told, to dip into the reserve-fund this year. He had a strong opinion as to the expediency of preserving a reserve-fund to meet contingencies, for it was impossible to say what might arise either as regards gas or water, particularly gas; and he believed the shareholders, as a body, would always admit the prudence of keeping up the reserve-fund. It was certainly better that they should accept something less than usual, than swallow up a fund that might some day prove the salvation of the company. As to the increase in the capital, it was generally admitted, not only by gas and water companies, but by all kinds of companies, that the more they were obliged to increase their capital, the more satisfactory it was to them, for it indicated an increased prosperity, bringing in its train an increased return to the shareholders. A few years ago this company were in the habit of declaring dividends of only 6 and 6½ per cent.; and it was only since they had increased their capital, in order to supply the necessary wants of the district, that they had won the confidence of the consumers generally, and been enabled to declare better dividends. There had not been a shilling expended, he ventured to say, which was not positively necessary; and it was well known that they could not have produced an ample supply for the whole district, had they not been exceptionally the children of fortune, and extended their works from time to time. Had they pursued a different policy, and had trade been as prosperous now as it was in former years, they would have been at a standstill, and found it necessary to do what they had fortunately never been obliged hitherto to do, and that was to cut off the water at certain hours, and lessen the supply itself. This had been done at Bradford, where they had given notice that the supply would be cut off during certain hours in the evening, and that there would not be any water supplied during the night. He hoped that the Hartlepool Company would be always in a position to give a full and adequate supply both night and day. But for the provision they had made, they might have exposed themselves to censure. He doubted not, however, that if the conduct of the directors continued to be the same in the future as it had been in the past, it would meet with the general approval of all concerned. Increasing requirements always called for increased facilities for supplying those requirements. This had been the principle on which the directors had invariably acted; and he had no doubt it was both wise and judicious, and would be justified by experience. He must say he did not entertain the same gloomy view of the iron trade that Mr. Waddingham and others appeared to do. There were those who thought the trade of England in the North had gone to other countries, and that it would never return. But he believed in the elasticity of the iron trade, and also of the shipbuilding and shipping trades. The latter had already shown signs of returning prosperity. The iron trade was undoubtedly very bad—it never was so bad—and the past two years had not brought about that improvement which they had expected. Nevertheless, they must have faith in their country, and they would soon witness a revival. It might not come this year, but surely it would be here by the spring of next. They would then be set on their legs again, and the days of large and healthy dividends would return.

Mr. TREWHITT (the secretary) explained that the increased expenditure was upon works, and not on consumption. He said that in 1874 the company got the power to raise the embankment at Hurworth, and commenced the work almost immediately, but when trade became so seriously depressed, the works were in such a critical condition as to necessitate their being completed.

Mr. DOBING thought it a questionable policy to add to the company's capital in the face of the depression in trade and the decreased consumption. The directors had purchased eight acres of land contiguous to the works at West Hartlepool, and what for he could not tell.

The CHAIRMAN stated that the land was formerly a quarry. It was in the market; and as the company wanted land for a gasholder, and there was no immediate prospect of other land, they purchased it at a cost of £2800. One consideration that influenced the directors in the purchase was that something might be put up—say a manure manufactory, which he believed it was wanted for—and as the land was contiguous to the works, from which the drinking water was supplied, there was a risk of pollution, which it was highly important to prevent. With respect to the reduction in the general expenditure, it had been already cut down as compared with the year 1875.

After some further discussion, the report was unanimously adopted. Messrs. Holmes and Waddingham were re-elected directors; as was also Mr. Bell, the retiring auditor.

A vote of thanks to the chairman concluded the meeting.

CORK GAS CONSUMERS COMPANY.

The Ordinary General Meeting of Shareholders was held on Monday, the 4th inst.—Mr. T. MAHONEY, J.P., in the chair.

The SECRETARY (Mr. DENBY LANE) read the notice convening the meeting, and the report of the directors, as follows:—

The price of gas to private consumers was reduced from 5s. 3d. to 4s. 9d. per 1000 cubic feet on Jan. 1 last. As the accompanying accounts embrace the period from that date to June 30, they, of course, show a falling off in the rental receivable from private consumers. A lower price has, however, been accompanied by an increase of consumption, which has to some extent compensated for the reduction.

The cost of coal has again been diminished, but, of course, this has led to a lower price for coke. Nevertheless, the income from residual products has been satisfactory. We have made contracts for further supplies of coal at moderate prices.

As the rate of interest has been low, we have exercised, to a small extent, the power of borrowing conferred on us by the resolution passed at last general meeting.

In the matter of our former accountant, the balance due to us has been diminished by a payment out of the Court of Bankruptcy, and we hold dishonoured bills of Messrs. Bowles Bros. and the Joint National Agency Company for £438 4s. These firms are now about to recommence business, and will, we are informed, issue bonds secured on real property for the full amount of their liabilities, and to be repaid by instalments, with interest at 4 per cent. If these bonds are paid in full, and any further dividend be paid in bankruptcy, the deficiency will be reduced below £1100. This amount consists, in a great part, of expenses of the prosecution, for which we will apply to the Crown, when the bankruptcy proceedings are closed.

With reference to the patent process of Messrs. Still and Lane, those gentlemen have addressed a letter to us, in which they ask that a committee of shareholders may be appointed to examine the facts and figures of the manufacture of gas previously to, and at the time when, a general meeting of shareholders voted them £1000; and they offer to repay the whole, or any part, of the remuneration they received, to which the committee do not think them justly entitled. We think this request a reasonable one, as questions involving figures can best be examined by a committee limited in number.

Your Act of Incorporation fixes the month of September as the time for the ordinary general meeting, with power for the company to change the time. With a view to holding the general meeting as soon as possible after the accounts are balanced, a resolution will be submitted to you, enabling the directors to hold the statutory general meeting in either August or September, as they deem fit.

Some of the retort arches which we first erected will soon require extensive repairs. In order to provide for this and similar expenditure, we have allocated £500 out of the profits to the depreciation-fund. After making this provision, the balance of the profit and loss account amounts to £6070. Out of this we recommend that a dividend (payable on the day after the general meeting), at the rate of 8 per cent. per annum, be declared. This will absorb £5193, and leave £877 to be carried to the reserve-fund, which will then amount to £5814. Since the last meeting we have, as required by the Gas Companies Clauses Act, invested £3200 of the reserve-fund. This sum, with £1825 previously invested, we have placed in railway debentures.

Since our last meeting, we have, by the death of the late Mr. Daniel Sheehan, lost the services of a most active and valuable director, who always attended to your interests with a zealous assiduity. We deeply regret the loss of so valuable a colleague. As he was one of the directors whose time came on for re-election at this meeting, we considered it unnecessary to fill up his place for so short an interval. The selection of a successor, therefore, rests with the general body of the shareholders.

Another director, Mr. David Barry, retires by rotation, is eligible, and offers himself for re-election.

One of the auditors, Mr. D. M'Carthy Mahony, retires by rotation, and does not offer himself for re-election. You will have to fill up this vacancy.

Resident Engineer's Report to the Directors.

Gentlemen,—I am happy to report that the enlargement of the mains effected last year has enabled me to reduce considerably the initial pressure at which gas is delivered from the works, and at the same time to maintain a most satisfactory supply to every district.

The effect of this change will be to reduce the amount of gas not accounted for.

The works are now in very good condition, and when the necessary repairs in hand are completed, we shall be able to meet, without difficulty, any demand for gas that may arise in the winter.

In the course of next spring it is intended to remove all the retorts from the arches erected in 1857, and it can then be ascertained accurately how far these benches require reconstruction.

I am, gentlemen, your obedient servant,

Gas-Works, Aug. 26, 1876. THOMAS TRAVERS.

Dr. *Capital Account, June* 30, 1876. *Cr.*

Share capital of the company	£150,000	0	0	Amount paid on shares	£129,844	0	0
Debenture capital of the company	22,600	0	0	Ditto debentures	22,600	0	0
				Uncalled capital and shares not registered	19,698	0	0
				Due by shareholders on registered shares	458	0	0
	£172,600	0	0		£172,600	0	0

Revenue Account.

Coals	£7,366	14	5	Rental—			
Labour	2,312	5	8	March quarter	£9,859	17	7
Wear and tear	1,239	11	2	June ditto	4,481	16	1
Oxide of iron, lime, &c.	197	9	2	Public lighting—			
Water and gas at works	128	19	8	March quarter	1,191	15	0
Public lighting	258	18	8	June ditto	671	15	6
Salaries	777	10	0	Residuals	4,830	18	7
Rents	112	9	8	Transfer fees	4	12	6
Rates	651	17	11				
Advertising and stationery	99	12	9				
Office expenses	132	19	5				
Auditors	20	0	0				
Directors	175	0	0				
Profit and loss	7,567	6	9				
	£21,040	15	3		£21,040	15	3

Profit and Loss.

Thirty-sixth dividend	£3,237	15	2	Balance	£6,255	0	5
Reserve-fund	3,017	5	3	Revenue	7,567	6	9
Interest—Debentures	390	16	6				
,, Bank, &c.	173	19	0				
Charges	175	19	4				
Insurance	51	0	0				
Law expenses	4	19	3				
Depreciation-fund	500	0	0				
Bad debts and allowances	200	0	0				
Balance	6,070	12	8				
	£13,822	7	2		£13,822	7	2

Balance-Sheet.

Capital account—				Permanent investment to Dec. 31, 1875			£143,683 15 9
Shares	£129,844	0	0	Extensions from above date to June 30, 1876—viz.:			
Debentures	22,600	0	0	Works	£148	3	3
Due to sundry persons	5,179	1	1	Mains	115	9	5
Dividends unclaimed	255	17	1	Services	56	15	10
Insurance-fund	1,093	10	2	Meters	62	12	7
Reserve-fund £4,886 10 5				Ammonia	9	7	8
Interest on above 51 0 10				Public lighting	17	18	5
	4,937	11	3	Engineering	25	0	0
Depreciation-fund	850	0	0		£435	7	2
Profit and loss	6,070	12	8	Less accounts, meters and services	19	5	3
							416 1 11
				Due by sundry persons			898 7 11
				Bank current account			1,000 10 7
				Suspense account, *re* former accountant, to Dec. 31, 1875	£1,726	19	5
				Less dividend received from Court of Bankruptcy	193	5	9
					£1,533	13	8
				Viz.:			
				Joint National Agency bills on hand	245	0	0
				Bowles Brothers bills	193	4	0
				Balance	1,095	9	8
							1,533 13 8
				Rental account			5,798 1 1
				Public lamps			2,199 1 2
				Stock, coals, meters, mains, oxide of iron, &c.			10,276 0 2
				Cork and Macroom Railway Company—invested in their debentures			1,825 0 0
				Cork, Blackrock, and Passage Railway Company for same			3,200 0 0
	£170,830	12	3				£170,830 12 3

The CHAIRMAN, after having expressed the regret felt by himself and his colleagues at the loss they had sustained in the death of Mr. D. Sheehan, proceeded to move the adoption of the report. In doing so, he said he had to congratulate the shareholders upon having presented to them something like the old account they had been accustomed to receive some years ago. Eight per cent. was a pleasant thing, and he did not think anything he could say would add to its beauty. Unfortunately, the directors would not be permitted to give them more than 8 per cent., and they could only live in the expectation of getting that continuously, which he hoped they would. The directors had placed their reserve account in a most satisfactory position. The largest reserve they had ever made was in 1872. At that time they held £5224 in reserve, and there was at the same time to the credit of the insurance-fund, £793, making a total of £6017. Unfortunately, one circumstance after another brought that down in the next year to £5700. In December, 1873, it was only £2800; in June, 1874, £1600; and in December, 1874, £1164. In fact, the sum in reserve then was only £371, and the sum to the credit of insurance £793. Having been reduced to that position, they began to recoup a little

when the Board of Trade gave them permission to charge a price for gas more commensurate with the greatly increased price of coal, and they were now in a position to add £877 to the reserve-fund of £4987, which, with the insurance-fund of £1093, and the depreciation-fund of £850, made a total of £7757. These figures showed a result which three years ago few could have hoped for. Some, however, hoped against hope, and gentlemen with good memories would recollect that he was one who hoped, and who advised others to hold their shares. Mr. Anderson, who was present, also recommended the proprietors to hold their shares, and told them that although it was low water then, the tide would come in again. In fact, Mr. Anderson showed his confidence in the future of the company by making a substantial investment in shares when they were down to £5 in the market, and he was happy to say he had them still. A resolution would be submitted for the approval of the meeting, empowering the directors to alter the time of holding the ordinary meetings. He believed they could hold the meetings a month earlier, and give the dividend at the same time, which would be no harm. They had to wait for the auditors —the corporation auditor and their own—but the auditors themselves agreed in the view that the accounts could be brought out in August, and they proposed to hold the meeting of the company as soon after as possible. There was one other matter to which he wished to call attention, and that was the paragraph in the report referring to the patent process invented by Messrs. Still and Lane. Those gentlemen had addressed a letter to the directors, which he would ask the secretary to read, and then he would supplement it with a further statement.

The SECRETARY then read the following letter:—

To the Board of Directors, Cork Gas Consumers Company.

Gentlemen,—Since the last meeting of the company Mr. Anderson has made some further trials of the patent process, which have not been satisfactory to him. It is our belief that experiments conducted for a very short time are not so sure a test as the results derived from actual work, extended over a lengthened period, and that the financial effect of continuous working is the true touchstone of the commercial value of any improvement. With this view we think it right shortly to recall to your attention the circumstances of the company at and after the date when the patent process was adopted in 1868. About that time the taxes paid by the gas company were enormously increased. It was decided that the right of laying mains was subject to municipal taxes which had not previously been paid on this easement, and the valuation of this right was raised from £1000 to £2800 a year. Notwithstanding the lower taxation during the four years ending 1867, the company were not able to pay its maximum dividend without in every year taking a small sum from previous profits, amounting in all to £843, but during the same period some additions were made to the insurance-fund. The total dividend paid during the four years amounted to £95,216, and the total rents and taxes paid were £3406, and the additions to the insurance-fund £712. Now, let us contrast the state of affairs for the four years ending 1871, during which time the process was in operation, adding that during the eight years from 1864 to 1871 inclusive, there was no change in the price of coals or residuals which could affect profits. In 1872 the extraordinary advance in coal commenced, and made further comparison impossible. In the four years ending 1871 the patent process was in operation, with the following results:—Dividends were paid amounting to £34,295, rents and taxes amounting to £7031, and additions made to the insurance-fund amounting to £1000. Therefore, during the latter four years, while the patent was used, the dividends increased by £9079, and additional taxation was paid amounting to £3625. Instead of taking £843 from reserve, £3517 were added, making a difference of £4360, and the additions to the insurance-fund were increased by £288. Therefore, the aggregate earnings of the company were, in the four years, increased by £17,352, or £4338 per year over the corresponding period—an increase equal to 60 per cent. That this did not arise from a greatly enlarged consumption of gas is proved by the fact that from 1867 to 1871 the increase in the quantity of gas sold was under 10 per cent., while the increase of earnings under the above head amounted to more than 60 per cent. In the year 1870, after the process had been two years in operation, a general meeting voted us the sum of £1000. We made no bargain with the company. The amount voted was a free gift of the shareholders, after they had seen the results and divided some of the profits earned. No question was ever raised about the justice of this award until the extraordinary advance in the price of coals reduced the company's profits, which, only for it, would never have fallen below 8 per cent., the minimum dividend. In 1868 the company obtained their Act of Parliament, having been opposed by the corporation, and were prepared to prove by engineering evidence what the net cost of coal for 14-candle gas should be. That this estimate was a moderate one is amply proved by the fact that the corporation who were then seeking for power to manufacture gas fixed a higher price in their bill. We are prepared to prove that the actual cost for net coal, while the process was used, was about from 40 to 50 per cent. below this estimate without any increase in any other item save labour. The rate of wages, as you are all aware, rose very much in Cork, and operated against your profits, but not to a very great extent. The cost of net coal was less than the estimate by an annual sum of £3000 to £4000, and only for certain circumstances would have been still less.

About this time, the attention of the directors of the Dublin Gas Company was called to the extremely low cost of gas in Cork, as compared with that incurred by them. The engineer and another officer of that company were sent to Cork to see the process in action, and their report was so favourable, that the Dublin Company took out a licence for the use of the patent, and paid us a royalty, until, by a new Act, their standard was raised to 20 candles—a standard for which we did not think the process suitable. The engineer of the Limerick Gas Company, after several trials, made a report equally favourable. The process has again been tried during the current year, and, while it was in operation, we can show that the cost of gas was exceptionally low.

We would ask then that a committee, quite independent of the directors, should be appointed to investigate, and decide on the whole question. If we have erred, we have done so in good faith. We had every reason to believe that the estimates prepared for Parliament were reasonable ones. Of course, such estimates should allow for a margin beyond the minimum cost, but we cannot conceive that estimates lower than those of the corporation should have exceeded the actual cost of coal by nearly 100 per cent.; and when we found that gas was manufactured at a much lower rate than by any other company in Ireland, that a very large addition was made to your profits, by which enormously increased taxation was met, much larger dividends paid, your insurance-fund strengthened, your reserve-fund largely augmented, and invested in securities out of your business, we naturally and properly attributed it to the mode of manufacture, which showed so low a cost for coal; for there was no other item of expenditure to which the saving could be attributed.

There is no unwillingness on our part that every fact should go before the public, but we think that a committee of business men, limited in number, are best able to weigh and decide on a financial question. To that committee we are quite willing that the whole question be remitted, with power to decide whether we were entitled to the remuneration we received, and we are quite ready to hand back to the company the whole or any portion of it to which the committee do not find us to be fully entitled.

We remain, gentlemen, truly yours,

A. A. STILL.
Aug. 28, 1876. DENNY LANE.

The CHAIRMAN said the directors considered the proposition in this letter a very reasonable one to make, inasmuch as there was a great variety of facts and figures which it would be impossible to go into at a large public meeting, with any prospect of arriving at a proper agreement. They, therefore, decided on recommending the shareholders to appoint a committee from amongst themselves to go into the matter, get all the statistics from the books verified by their accountant, and then come to a conclusion as to what should be done in the matter. As there were several shareholders now present who were not in the company when the matter was first brought forward, he would read for them an extract from a speech of the late Mr. J. F. Maguire, at the meeting of the company in September, 1870, when it was resolved to allocate a sum of money to Messrs. Still and Lane, on account of their patent. [The chairman then read the speech of the late chairman, in which he spoke of the patent process as having been in use by the company for the previous year and a half, and proving so advantageous to the company that, without it, it would have been impossible for them to declare the dividend of 8 per cent. they were paying; and intimating that the directors considered it due to the patentees to award them a sum of money for the use of the patent. The recommendation of the report was adopted by the meeting.] He had requested the letter should be read, because it appeared to him the integrity of the directors was more or less bound up in the action taken on that occasion. They considered at the time that the company were benefiting by the patentees mode of producing gas, and they attributed the large profits they made to the improvement which took place in the manufacture at their works. They were fortified in that opinion by the fact that the engineer of the Dublin Gas Company came down to test the matter at their works, and paid a royalty to Messrs. Still and Lane for the use of the patent in Dublin. Such a decision was sufficient to warrant the directors, as non-professional men, in concluding that the process was valuable, and that they were justified in bringing it under the notice of the shareholders. What they said then, they said now. There were only four of the then board of directors now present, and they took the responsibility of the matter upon their shoulders. Then and now they believed they were doing what was for the advantage of the company. Whether they were right or wrong in coming to that conclusion was a question entirely for the committee whom they asked the shareholders to appoint to-day. They would entirely relegate the matter to the committee, who would have all the figures before them, and Mr. Anderson to consult with; and whoever might compose the committee, he was sure, if, looking at it from a business point of view, they saw that the company derived any advantage from the process, they would not let its inventors go unrewarded.

Mr. ALCOCK thought that, before the committee were appointed, the shareholders ought to have the benefit of the report made by Mr. Anderson on the subject.

The CHAIRMAN observed that it had been stated Mr. Anderson's report was unfavourable to the process; and if that report were laid before the public meeting, what would be the use of appointing a committee? He wanted to have all the facts and figures placed before the committee.

Mr. M'MAHON was opposed to the appointment of a committee, as there were very few gentlemen competent to go into a matter of that kind.

The CHAIRMAN: If a few gentlemen, sitting in committee, are not competent to deal with it, how much less a large public meeting, where every one will have his say, and be entitled to his opinion, whatever it may be. I need not tell you that the directors do not intend to take any part in the selection of the committee.

Mr. G. LYNCH said he had been asked to propose that the matter be referred to a committee. A large public meeting like that could not possibly go into the matter. Until he came into the room, he had been ignorant of the fact which now appeared from the record read by the chairman—that the £1000 was voted to Messrs. Still and Lane unconditionally; but these gentlemen had since offered to refund the money in certain contingencies. Whether that would be a wise thing to do was open to question, but he doubted that a large public meeting was competent to decide such a matter.

Mr. LANE: I may say that, as far as Mr. Still and I are concerned, we are not in the slightest reluctant to have all the figures brought before the public; but we are not quite so sure that it would be for the advantage of the company to do so.

Mr. ALCOCK said the matter of the patent process had been repeatedly before the half-yearly meetings, and it had been unanimously decided to refer it to Mr. Anderson, consulting engineer, a thoroughly scientific man of European note. He thought it would be strange to leave the decision of such a purely scientific matter to a committee of private individuals. He was a director of the Queenstown Gas Company, and he was aware that Mr. Anderson had the use of their works for the purpose of experimenting with the patent process, and subsequently he tried it at this company's own works, under the surveillance of their own officers; but the result of the experiments was unfavourable. He thought it was trifling with them, not to give the shareholders the report they had been so long waiting for, and then let Mr. Lane's able and lucid statement of figures, with Mr. Anderson's report, both go before the committee. If they had erred in the course they had hitherto taken, it was never too late to mend. It would have been better, in his opinion, to have referred it to the consulting engineer at the time.

Mr. LANE said Mr. Alcock was in error in supposing that Mr. Still and he had ever agreed that Mr. Anderson's report on the process should be final. All they understood was that Mr. Anderson was to report on the invention. He thought they were rather hardly treated, where a gift had been given to them by the shareholders, but over which the shareholders had no possible legal right whatever, if from a feeling of honour and honesty on their part they offered to give back the gift, if the committee were not satisfied that the company were not right in having given it to them. It was treating them hardly to deprive them of an opportunity to put the whole thing before a committee, and thus give them an opportunity of justifying themselves. It was not a matter of money with him—it was more than that, it was a matter of character. He wanted to show that he was as thoroughly convinced, when he received the money, as he was of anything he ever believed, that the company were reaping great advantages from the use of the patent. He wanted to show his reasons for believing that; and it would be rather hard to deprive him of an opportunity of doing so.

The CHAIRMAN, in answer to inquiries, said the shareholders should clearly understand that the money was originally given in consequence of the directors being fully impressed with the belief that they had already received from Messrs. Still and Lane advantages much greater than the money voted to them. These gentlemen wanted to have a committee before whom to lay the facts and figures that guided the directors in that matter, showing that when the process was put into action the cost of gas was much lessened, and that, therefore, in asking the shareholders to make that grant of £1000, they were simply paying those gentlemen for services already rendered.

A very decided expression of opinion having been given by several shareholders against the appointment of a committee,

Mr. LYNCH said he thought, after what had occurred, it would be better to withdraw the motion for a committee, since it turned out now that the money was voted unconditionally for value already received. They had often made bad speculations, and even supposing that this thing had not turned out as advantageous as it was supposed it would, he did not think it would be respectable for a company like this, because they had made a mistake, to want to take back the money.

Mr. BARRY said there was no proof that there had been any mistake.

Mr. LANE: There was no mistake at all.

The motion for the adoption of the report was then put and carried.

Mr. HALY proposed, and Mr. LAMBERT seconded, the following resolution, which was agreed to:—"That the ordinary general meeting of the company, now held in September in each year, may, in accordance with the provisions of the 30th section of the Cork Gas Act, 1868, at the option of the directors, be held in the month of August or September."

Mr. FOLEY proposed—"That a dividend at the rate of 8 per cent. per annum be declared for the half year ending June 30, 1876, on the paid-up capital of the company, and that the same be made payable on the 5th of September next."

Mr. ALCOCK seconded the resolution, and it was passed.

After the election of directors and auditors, the subject of Messrs. Still and Lane's patent was again referred to, and a motion was made by Mr. FITZGERALD, seconded by Mr. PAUL, that a committee of six shareholders be appointed to investigate the matter.

Mr. SHEEHAN said nothing could be more straightforward, honourable, and independent than the action on the part of Messrs. Still and Lane and the directors, and he thought it would be a most unusual thing to try back upon an occasion of the sort. However, if there was any doubt of the *bona fides* of the transaction, let a committee be appointed.

After some further conversation,

Mr. ANDERSON volunteered some observations. He said he was not at all afraid to express his opinion on the matter. He wished the shareholders to know that he had fairly undertaken their business, and it was no fault of his, nor of anybody, that prevented his reporting on the subject before the previous week. He had not yet expressed any opinion upon the matter, but he had held opinions concerning it, and, in consequence of a remark made by the chairman, he wished now to say that he did not approve of the process. On the contrary, he disapproved of it strongly. At the same time, he quite concurred in the views expressed, that it was not right to appoint a committee to investigate the past. The question of the reading of his report was for the meeting to decide; he had no wish that it should be read, nor did he desire that it should be withheld.

Some further conversation ensued, and eventually the following resolution, proposed by Mr. G. BARRY, and seconded by Mr. B. J. SHEEHAN, was unanimously adopted:—"That no further action be taken by the shareholders in reference to the Still and Lane process, and that the company, while declining the handsome offer made by these gentlemen, return them thanks for having made it."

A vote of thanks to the chairman terminated the proceedings.

LEICESTER GAS COMPANY.

The Half-Yearly Meeting of Shareholders was held on the 1st inst.—Mr. W. E. HUTCHINSON in the chair.

The SECRETARY (Mr. Billson) read the directors report, which was as follows:—

. . . . . .

The half-yearly statements of the accounts of the company are submitted to the proprietors of this company.

The directors have pleasure in reporting that the gas and meter rentals, for the half year ending June 30 last, amount to the sum of £35,009 11s. 11d., showing an increase of £2864 4s. 5d. over that of the corresponding half year of 1875.

The balance to the credit of revenue is £14,608 6s. 2d., which, being added to the amount brought from the account of the past half year, gives a sum of £19,491 11s. 8d. now to be dealt with.

The directors recommend that dividends be declared of 11s. 6d. per share on each A share, 7s. 6d. per share on each B share, and of 5s. 7d. and one-fifth per share on each C share.

The results of the past half year's working have been most satisfactory to the directors.

The directors who retire by rotation are Messrs. George Foxton, W. Simpson, and Alfred Paget. They are eligible for re-election.

The directors have pleasure in reporting that the works and property of the company are in efficient working order.

The CHAIRMAN, in moving the adoption of the report, congratulated the shareholders upon the favourable state of their affairs. The increase in the demand for gas and the meter-rental during the past half year had been great, and had been attended with a corresponding increase of profit, so that the directors were not only able to pay the shareholders the maximum rate of dividend, but also to restore to the reserve-fund the remainder of the amount they took from it two years ago, in order to meet the loss occasioned by the extraordinary rise in the price of coal and other materials necessary for the manufacture of gas, and in order to avoid the necessity of raising the price of gas to their consumers, as was the case with almost every other gas company in the kingdom. They had now a favourable opportunity of restoring the amount taken, and they proposed to do so. The accounts presented to the meeting were so fully explained that it left very little for him to say. With regard to the capital account, the expenditure had been increased during the year by nearly £5000, making the total amount of capital expended on the 30th of June last, £200,655 9s. 6d. The directors had purchased for £1300, including law charges, the School of Art premises adjoining, believing that in a short time they would require them for the enlargement of the offices. They had spent £2004 for new buildings and manufacturing plant, and £1017 in laying new mains and service-pipes. They had also spent £521 for new meters, making the total expenditure for the half year £4886. If the town kept on increasing at its present ratio, they would have to meet a rather formidable outlay, in order to keep pace with the demand for gas. The large reduction which had taken place in the cost of coal and iron had enabled them to let their contracts considerably below those they had to make a year and a half or two years ago; but they were informed that, as soon as the coal and iron trades revived, they must no longer expect to have their contracts taken at the present favourable rates. On the 30th of June there remained uncalled up of the new shares the sum of £20,000, but since that period the directors had made the last call on those shares. Their borrowing powers on the 30th of June were available to the extent of £35,000, and altogether they felt themselves in a very comfortable position.

Mr. FRISBY seconded the motion for the adoption of the report.

Mr. J. BENNETT, in supporting the motion, said the fact that they had made £8000 profit, in addition to being able to pay the maximum allowed by law as the dividend, must be gratifying to all the shareholders. He hoped before long the directors would see their way to make a reduction in the price of gas for the benefit of the public. He also thought the remuneration of the directors was inadequate for the services rendered, and that instead of £500 being granted to them, £750 should be placed at their disposal.

Mr. GRAY suggested that Mr. Bennett's proposition should come in a separate resolution after the report had been adopted. He was glad the company did not raise the price of gas when the cost of coal and materials went up so rapidly. He believed the directors adopted a wise course, and the town, he was sure, would appreciate their conduct in the matter.

The CHAIRMAN said the subject mentioned by Mr. Bennett would have to come forward in a separate resolution.

Mr. HART remarked that while the shareholders would be pleased at the splendid report which had been presented, he thought the public, when they came to see what a large profit the company were making, would think they ought to lower the price of gas. He knew that at the present time it was quite as reasonable as in many other towns, but if they could afford to benefit the public by a further reduction, he thought they should do so.

The CHAIRMAN said the directors were desirous of reducing the price as soon as they could do so fairly, and there was every probability that in the course of, and perhaps early, next year they would be able to carry out their desire in the matter. Still the shareholders must not lose sight of the fact he had before mentioned—that the company would not be able to let their contracts so favourably when the coal and iron trades revived.

The report was then adopted, and the dividends recommended in the report were declared.

Mr. BENNETT moved the re-election of the retiring directors, which was seconded by Mr. GRAY, and carried. He (Mr. Bennett) also proposed that the sum granted to the directors for their services be increased from £500 to £750.

A SHAREHOLDER seconded the motion, which was supported by Mr. GRAY.

Mr. HART complained that the motion had come before the shareholders without notice, and suggested that it should be left for a larger meeting. He thought £50 each per year was pretty good remuneration for the directors of a gas company.

The CHAIRMAN said the amount received by the directors of the Leicester Gas Company was moderate compared with what was received by the directors of like companies in other towns, and if Mr. Hart knew the work which had to be done he would be of opinion that the £50 they each received was a small amount. He and his colleagues, however, would leave the matter entirely in the hands of the shareholders.

Mr. HART moved that the matter be adjourned to the next meeting, which was seconded by Mr. CHAMBERLAIN.

The motion was carried by a majority of one.

The CHAIRMAN remarked that as there were so many dissentients in the room, he and his colleagues felt that they could not accept any further remuneration under the circumstances. At the same time they were deeply grateful to the gentlemen who had supported the motion.

A vote of thanks was passed to the directors and to the chairman, and the proceedings terminated.

SUNDERLAND GAS COMPANY.

The Annual Meeting of this Company was held on Wednesday last—Mr. E. C. ROBSON in the chair.

The following report and statements of account were presented:—

The directors herewith present their annual report and the balance-sheets of the company, which have been duly examined and certified by your auditors.

An interim dividend was paid in March last, and your directors now recommend the declaration of a like dividend of 5 per cent. on the original stock, and of 4¼ per cent. on the additional capital stock of the company, payable on Sept. 15. They also recommend the payment, at the same time, of the sum of 5s. per share on the original stock of the company, on account of the deficiency in the dividends of previous years.

Your directors—acting in accordance with the policy which has ever guided them in their dealings with the public, of reducing the price of gas whenever practicable—have pleasure in announcing a further reduction of 3d. per 1000 cubic feet on all gas which may be consumed after the commencement of next quarter; and they trust that the increased consumption which ought to result, combined with the decrease in the cost of coals, and other items of expenditure, will enable them to confer this boon upon their customers without injury to the interests of the proprietors.

Your directors regret to have to report the death, during the past year, of two of their number—Thomas Hewett, Esq., and Anthony John Moore, Esq. Both of these gentlemen were connected with the company from its commencement, both have filled the office of chairman, and to both the shareholders owe a deep debt of gratitude for their services during the early history of the company, when contending with heavy financial and other difficulties.

Last year your directors announced that your Hendon works will shortly require to be extended, and they have now to report that they have let to respectable contractors the erection of an additional retort-house, 250 feet long by 52 feet broad, and two coal-sheds, each 250 feet in length and 30 feet in breadth, which, with all requisite apparatus, have to be completed previous to the winter of 1877.

To enable your directors to meet the payments which will become due to the contractors from time to time, they have given notice of their intention to sell by auction, at the close of the annual meeting, 1000 shares of £5 each, being part of the "additional capital" authorized to be issued under the Sunderland Gas Act, 1857, the maximum dividend on which is limited to 6½ per cent.

The retiring directors are Messrs. E. C. Robson, John Bowey, W. Tate, and John Tindall. The retiring auditor is Mr. H. G. Armstrong. The whole of the above, being eligible, offer themselves for re-election.

General Balance, June 30, 1876.

Dr.				*Cr.*			
Shareholders capital—				Works	£158,280	5	7
Original	£82,600	0	0	Amount due for gas, coke, &c.	3,550	0	0
„ 5 per cent.	8,000	0	0	Interim dividend	5,767	6	3
	£90,600	0	0	Cash in hands of Messrs. J. Backhouse and Co.	19,250	15	9
Additional capital	30,000	0	0	Cash in hands of secretary	17	1	7
	£120,600	0	0				
Premiums on 6000 shares	19,321	16	7				
Contingent-fund	3,000	0	0				
Accounts due to sundries	23,169	3	11				
Profit and loss	20,794	8	8				
	£186,885	9	2		£186,885	9	2

Revenue Account, for the Year ending June 30, 1876.

Wages	£7,902	17	3	Balance from last year	£20,177	10	6
Coals, lime, oxide, and leading	13,310	11	1	Less dividend paid	16,140	0	0
Ground, deposit, and water-rents	318	3	10		£4,737	16	6
Rates and taxes	1,789	3	11	Gas and meter rentals	42,007	5	3
Repairs of works, mains, and meters	7,032	10	1	Residuum	6,952	18	0
Salaries and direction	2,239	8	6	Sundries	132	14	3
Printing, stationery, and incidentals	413	14	7				
Law account	29	16	1				
	£33,036	5	4				
Balance	20,794	8	8				
	£53,830	14	0		£53,830	14	0

The CHAIRMAN, in moving the adoption of the report, said it was frequently remarked that history repeated itself, and he thought the history of that company this year was pretty much what it was at the last annual meeting. There is, he continued, the same dividend of 10 per cent., the same sugar-plum bonus to the holders of old shares of 5s. each share, and there is a similar reduction in the price of gas to that which we had the satisfaction of announcing last year. Nothing gives us greater pleasure than taking the public into partnership, and doing them all the good we can, providing we do no harm to those precious individuals—ourselves. As I told you once before, I might almost make the same speech over again that I did the last time. Indeed, I feel in much the same position as I once saw a clergyman in, who had to preach the same sermon twice over, and who told his congregation that most likely they had forgotten the sermon, but that if there were any who had not, they would have the benefit of hearing it again. May I trouble you to look at the statement of accounts, and you will see that there is a considerable decrease in gas and meter rentals—£2367. That decrease, I am happy to tell you, is not due to any falling off in the consumption of gas, for we have manufactured and sold no less than 15 millions of cubic feet more than we did in the previous year; but the decrease is owing to the reduction in the price, amounting to £3500. That is to say, the public have received £3500 worth of gas in excess of what they would have had had they paid the old prices. That is the most prominent item on the credit side of the account. In residuals there is a considerable falling off; but in last year's report, you will remember, we congratulated you on having got a very large sum for residuals, which, in fact, formed an unexpected item in the profits at that time. The sum is £383 less than last year. It will be satisfactory to the meeting to know that this falling off has taken place without causing any reduction in the dividend, owing to the great items of coals, lime, and leading. There has been a saving of £2592 upon coals as compared with the previous year. That is a very large sum to save, but it is the only item upon which we have saved anything of any consequence. There is a reduction of £250 in the amount for repairs, but that is not a matter to be relied upon at all, because the money spent on repairs depends upon the condition of the retorts. That is all I have to remark upon that part of the report; but, lest any gentleman should be afraid that his profit and dividend are in any danger by so large a reduction as that we propose to make — bringing the cost down to 3s., 2s. 8d., and 2s. 6d. per 1000 cubic feet, according to the quantity consumed, and a corresponding reduction upon the public lamps—I may tell him that, although the reduction will amount to £3400, or nearly the same as last year, the contracts which the company have been fortunate enough to enter into for coals, warrants us in believing our future position will be as good, accidents excepted, as it is at present. I will not prophesy, remembering the advice of Josh Billings, "Never prophesy,

unless you know;" but that is what we may expect if we keep clear of accidents. Our extensions at Hendon are the next item to which I wish to refer. There is a plan on the table for your inspection wherein a large new retort-house, the foundations of which have been dug and a portion of the walls built, is marked in buff. It will manufacture 50 per cent. more than the biggest retort-house we have now, and it is well situated and well built. That retort-house will produce as much gas as is now made in winter, and this extension, taking the progress of the company for the future at the same ratio as that we have known for the past, will enable us to manufacture gas till the year 1889. Whilst I am talking about the progress and consumption of gas, it may be as well to tell you that a period of thirteen years has seen us double the amount of gas sold in this town. I leave you to estimate—which you can do as well as I can—what it may be in the next thirteen years, but the extension I have alluded to will carry us on, in all human probability, to that date. Whilst I am on the subject, I may also tell you that there is now room at Hendon, not only for an additional retort-house after the one which has been begun is finished, to the north of the existing ones, but also for two new gasholders of the same size as those we have there already. Therefore, I may say, we have space for extensions equal to nineteen or twenty years, unless the town takes a great onward leap, and things go on faster than they have done. That is our condition at present, and I trust you will not think the directors were wrong in purchasing the amount of land they did there—forestalling any such want as may arise in the want of gas illumination. I think it was a warrantable expense to go to, because the value of land has increased since then, and we should have had to pay more money for it at the present time. There is one circumstance mentioned in the report, which one cannot allude to without a considerable amount of feeling, and that is the removal by death, during the last month or two, of two of our oldest members. One of these is Mr. Thomas Hewett, my predecessor in this chair some 22 years ago, a gentleman who paid the closest attention to the interests of the company for many years, and who was unwearied in his attention to their affairs at a time when the closest attention was absolutely requisite to keep things from going to the bad. He died full of years, and was always a most pleasant and satisfactory colleague. The other is my old friend, schoolfellow, and personal acquaintance of many years standing, Mr. A. J. Moore, who has even a higher claim upon you than Mr. Hewett, because he was the founder of this company, and any one who remembers what took place when this company began well know that there was no amount of zeal, no amount of diligence, no amount of ability spared by Mr. Anthony John Moore to set the company afloat. I could not say less in speaking of him; I might say more, for to me he was a personal friend; but he has gone from amongst us, and I thought it was only right I should pay this tribute to his memory. His ability was great, his power of oratory, as will be remembered by those who knew him in his early days, was of a high order; and his manner always courteous and agreeable to those who had the pleasure of acting with him in public or private matters.

Mr. M'Guigan, after asking if the places of the deceased directors had been filled, and, if so, who had been appointed, said he wished to make a few remarks as to the quality of the gas. He had been travelling lately, and had made it his duty to make inquiries into the price of gas in different towns, and also as to the quality. Of course, it was very satisfactory that the company had been able to reduce the price, but he must say that, after all the reduction, his gas bills were higher than they used to be. There was very little illuminating power, which, indeed, was lower than in any part where he had travelled. In Dublin they paid as much as 4s. 6d. per 1000 feet for their gas, but their illuminating power was greater, and consequently their bills did not come to so much as they did in Sunderland. After complaining that air was put into the gas, in order to make the pressure high, he, adverting to the vacancies in the directorate, said he must object to the system of the directors themselves filling such vacancies. It would not be a great inconvenience to wait until the subject came before the full meeting of shareholders.

The Chairman: Mr. M'Guigan asks whether we have filled up the vacancies caused by the death of the two gentlemen I have spoken of. We have not, neither does it rest with the shareholders assembled at the general meeting to fill up the vacancies which occur by death or resignation during the term for which those directors were elected. They were elected for three years, and only a portion of the first year had expired when their deaths took place. It rests, according to the Act of Parliament, with the board only to fill up those vacancies, unless we wait for two years more, and then it would be in the hands of the company to fill them up. Two years hence, if we go over the time without filling up the vacancies, it would remain with the general meeting to fill them up, but the Act of Parliament leaves it to the board to fill them during the term of office for which they were elected. We have not yet thought of any persons to fill up those vacancies, but if we do fill them up, I am satisfied we shall be able to find gentlemen who will be satisfactory to the shareholders generally. The last vacancy we filled up was that caused by the death of Mr. Lindsay two years ago, when my excellent friend, Mr. Laing, was appointed. The second part of Mr. M'Guigan's remarks was directed mainly to the quality of the gas, and to the supposed fact of the company pumping air into the gas for the sake of adulterating the article sold. Had Mr. M'Guigan been in the milk trade, that would have been a proper idea for him to start. We feel we are enjoying the sole sale of gas in this borough, and I challenge Mr. M'Guigan to prove that it is of lower quality than in any other town at the same price. In the first place, however, I object to him testing gas simply by his recollection, after having travelled hundreds of miles. It may be that Ireland is a particularly dark country, and that a small light shines a long way. Our gas in Sunderland is almost always two candles ahead of the statutory strength of light imposed upon us by Act of Parliament. It has never been tested by the officials of the corporation but that has been found to be the result; and that is a statistical fact which ought to be an answer to the recollection of any person who goes on his travels. As to pumping air in, it is simply a hallucination. It has arisen in Mr. M'Guigan's brain.

Mr. M'Guigan: I am not the founder of it.

The Chairman: Certainly not, sir. I do not think it was ever founded at all. I think it is a thin and vapoury idea.

The motion was then put to the meeting and agreed to.

Mr. Vint remarked that there was an impression very current that pumping air was resorted to by gas companies, but it was one of the most absurd stories ever invented, because for every 1 per cent. of air mixed with the gas the illuminating power was reduced 3 per cent., so that it was perfect folly to suppose they would throw away 3 per cent. of light to get 1 per cent. extra measurement. In London people brought the most extraordinary charges against gas companies, and that was one of them.

The Chairman said a great deal of the complaint arose through bad fittings, and he would advise people to get improved burners.

Mr. Parker moved the next resolution as follows:—"That a dividend of 5 per cent. be declared upon the original stock of the company, and of 4½ per cent. upon the additional capital stock of the company, payable on the 15th inst., and that the sum of 5s. per share be paid at the same time on account of arrears of dividend on the original stock of the company."

Mr. R. Elwin seconded the motion.

Mr. J. Richardson said the bonus of 5s. was no more than they had a right to expect, inasmuch as, being one of the original shareholders in the company, he knew that for a considerable time they received a very small amount of money.

The Chairman: True; we received nothing for some time.

Mr. Richardson: It is, therefore, only what we have a right to expect.

The motion was agreed to.

Mr. Alcock moved—"That Messrs. E. C. Robson, John Bowey, W. Tate, and John Tindell be re-elected directors," and remarked that the way in which the affairs of the company had been managed, and the results to the shareholders and the public, were such as must be very satisfactory.

Mr. J. Watson seconded the resolution, and it was agreed to, after a few remarks from Mr. Alcock, expressive of regret at the loss of the two gentlemen alluded to by the chairman.

Mr. Richardson moved the re-appointment of Mr. H. G. Armstrong as auditor.

Mr. Matthew seconded the motion, which was also unanimously agreed to.

The Chairman, in returning thanks on behalf of himself and the other directors for their re-election, said that for 20 years there had not been in the board a single sentence said which either sayers or hearers would wish to have unsaid. On the contrary, everything had been done in the most cordial and unanimous way, and he believed that was, as he had often told them, one of the secrets of the success of the company.

The meeting then terminated.

At the conclusion of the annual meeting, the company adjourned to the Queen's Hotel, where an excellent luncheon had been prepared. A sale of 1000 £5 shares in the company afterwards took place, Mr. George Bulman officiating as auctioneer. The whole of the shares were disposed of in less than ten minutes, the following high prices being obtained:—

407 shares, at	£9	0	0
420 " "	9	1	0
50 " "	9	2	6
48 " "	9	3	0
75 " "	9	5	0
1000 Average	£9	1	2

BELFAST CORPORATION GAS-WORKS.

At the Monthly Meeting of the Belfast Town Council, held on Friday, Sept. 1, the Mayor (Mr. R. Boag) in the chair, the following report by the Gas Committee of the Corporation was presented:—

Your committee have pleasure in submitting the accounts of the gas-works for the year ending June 30 last, which show a net profit on the year's working of £7949 9s. 2d.—a result which, having regard to the fact of the quality of the gas having been kept considerably above the standard, and to a reduction in price from 4s. 6d. to 4s. 2d. per 1000 cubic feet, which took place at the commencement of the year, your committee consider very satisfactory.

A new contract having been made for coal on favourable terms, justifies your committee in recommending the council to make a further reduction in the price of gas—viz., from 4s. 2d. to 3s. 11d. per 1000 cubic feet, such reduction to take effect from July 1 last.

The sum now standing to the credit of profit and loss account is £21,864 10s. 7d., and your committee are of opinion that the present is a favourable opportunity for setting aside a fund to meet any unexpected contingencies that may hereafter arise, and they have arranged to transfer the sum of £20,000 out of the profit and loss account to the credit of a contingent-fund,

Your committee recommend the salaries of the following officials to be increased from July 1 last, that being the commencement of the financial year for the works—viz., James Stelfox, manager, from £500 to £600 per annum; C. E. Stelfox, book-keeper, from £150 to £175; James L. Hamilton, collector, from £150 to £175; John Hamilton, office clerk, from £140 to £160; William Anderson, collector, from £120 to £130; James Andrews, do., from £120 to £130; Edward Poole, rental clerk, from £100 to £110; John Ellis, do., from £90 to £100; James Hunter, do., from £90 to £100; William Mortimer, do., from £90 to £100.

The following is the manager's report appended:—

To the Chairman and Members of the Gas Committee.

Gentlemen,—I have to report that during the summer the usual repairs of plant have been carried on, and that the works are now in efficient order for the supply of gas during the coming season.

Up to the present, 96 old retorts have been removed, and the arches repaired. Of these, one-half have been replaced by new ones, and the resetting of the remainder is being proceeded with.

All necessary repairs in connexion with the engines, steam-pipes, and exhausters have been executed, or are in course of execution.

The gasholders have been thoroughly painted, and some slight repairs which were required effected.

The other apparatus has been cleaned and painted; and, in connexion with the buildings, all necessary painting, whitewashing, &c., have been attended to.

The new section of the works, which has not yet been in use, has also been kept in efficient order.

The cartway from the works entrance, along side and front of retort-houses, has been paved with square setts, which will effect a saving in the cost of maintaining the road.

A new wharf has been constructed along the line of the Blackstaff, for the discharge of coal, which, though not yet taken off the contractor's hands, is in use at the present time.

The construction of the tramway for conveyance of coal from the new wharf to the retort-houses, &c., which was entrusted to Messrs. Ritchie, Hart, and Co., is being rapidly proceeded with, and promises to be an effective arrangement.

The hydraulic machinery for lifting the coal from the barges has been contracted for with the well-known firm of Sir William Armstrong and Co., of Newcastle-on-Tyne, and delivery of same is expected almost daily. Meanwhile the portion of the work to be done by the corporation in connexion therewith has been pushed on, and a considerable portion is now ready for erection.

An experimental works for the purpose of testing the value of gas coals has been erected, and will be of great service. The necessary apparatus in connexion therewith has been received, and is at present ready for fixing.

During the year, 10,483 yards of main-pipes were laid of the following sizes:—2-inch, 208 yards; 2½-inch, 158 yards; 3-inch, 2194 yards; 4-inch, 1205 yards; 5-inch, 2014 yards; 6-inch, 1065 yards; 10-inch, 1644 yards; 12-inch, 1847 yards; 36-inch, 148 yards.

An effort has been made, in connexion with the late Industrial Exhibition, to impress upon consumers the absolute necessity of having suitable burners if they expect to get satisfactory results, and this attempt has, I believe, been attended with a measure of success. In addition to this, the building in which the exhibition was held, and concerning the lighting of which so many complaints have been made for some years past, was most satisfactorily illuminated by the substitution of improved burners, at a cost merely nominal (Signed) James Stelfox.

I. *Dr.—Capital Account, June* 30, 1876.

To Loans on mortgage	£468,754	0	0
Perpetual annuities	2,245	14	11
Purchase-money of the Shankhill property	140	0	0
	£471,139	14	11

Cr.—Capital Account, June 30, 1876.

By Expenditure to June 30, 1875	£439,804	5	0
Additional outlay—			
Cost of conveyance of works, Messrs. Freshfield and Williams's costs *re* loan from Bank of England, mortgage stamps, &c., and commission on loans	3,249	12	9
New buildings, machinery, and extension of works, including quay wall, experimental works, and square sett paving	1,476	2	6
New mains	5,128	4	5
" services	584	16	6
" meters	1,144	11	4
	£451,387	12	6
Balance	19,752	2	5
	£471,139	14	11

II. *Dr.—Revenue Account, for the Year ending June* 30, 1876.

To Sale of gas		£75,813 18 8	
Less discounts	£4,794 1 8		
,, bad debts	284 9 8		
		5,078 11 4	
			£70,735 7 4
Public lighting, and under agreements			8,928 9 2
Rental of meters		£4,115 11 6	
Less discounts	£6 9 11		
,, bad debts	17 0 8		
		23 10 7	
			4,092 0 11
Residual products—			
Sales of coke and breeze, less labour, &c.		£15,358 17 11	
Used of coke for furnaces, &c., in carbonization		6,144 0 9	
			21,502 18 8
Sales of tar			2,109 7 6
,, ammoniacal liquor			479 16 6
Rents			45 7 6
Gas-rents recovered (formerly written off as bad)			7 8 5
			£107,900 16 0

Cr.—Revenue Account, for the Year ending June 30, 1876.

By Coals, including dues, carriage, unloading, and all expenses of depositing same on works	£48,910 6 11
Purification and sundries (labour, £630 19s.)	1,552 8 9
Salaries of engineer and assistant	692 14 2
Wages (carbonizing)	5,298 2 3
Repairs and maintenance of works and plant (including renewal of retorts), machines, apparatus, tools, materials, and labour	5,026 6 5
Residual products used in carbonization and for engines	6,144 0 9
Distribution of gas—	
Salaries of chief inspector, inspectors, assistant inspectors, and clerks in department	898 15 0
Repair, maintenance, and renewal of mains and service-pipes, including materials, laying and paving, and labour	1,094 2 4
Repairing, renewing, and refixing meters	1,290 0 11
Public lamps—	
Lighting and repairs	2,181 0 6
Rents, rates, and taxes—	
Rents	155 0 0
Rates and taxes	2,588 15 0
Salaries of cashier, accountant and clerks, office-keepers and messengers	1,379 15 10
Salaries of collectors	545 0 0
Stationery and printing	156 0 7
General establishment charges and incidental expenses	318 11 5
Cost of audit	42 0 0
Law charges	461 12 11
	£78,734 13 9
Balance carried to net revenue account	29,166 2 3
	£107,900 16 0

III. *Dr.—Profit and Loss Account* (*Net Revenue*).

To Balance from last year's account	£13,915 1 5
,, revenue account	29,166 2 3
	£43,081 3 8

Cr.—Profit and Loss Account (*Net Revenue*).

By Interest on purchase-money and loans for the year ending June 30, 1876 (less bank interest, £351 9s.)		£21,216 13 1
Balance, consisting of balance from last year's account	£13,915 1 5	
,, ,, net profit on year's working	7,949 9 2	
		21,864 10 7
		£43,081 3 8

IV. *Dr.—Balance-Sheet.*

To Balance from revenue account	£21,864 10 7
,, capital account	19,752 2 5
Sundry amounts due for interest to June 30, legal costs, &c.	3,374 3 6
	£44,990 16 6

Cr.—Balance-Sheet.

By Cash at bankers		£21,639 12 0
Value of stocks in hand		6,849 4 11
Accounts due for gas	£7,762 7 9	
,, meter-rent	969 18 6	
		8,732 6 3
Sundry accounts for coke, tar, &c.		1,607 15 11
,, service-pipes		263 0 5
Sundries, consisting of council lamp account (£4048 5s.), harbour lamp account (£290 16s. 4d.), &c.		4,519 6 4
Half year's taxes unexpired, carried forward		1,379 10 8
		£44,990 16 6

Sir JOHN SAVAGE, in moving the adoption of the report of the committee, remarked that the manager's report would save him a good deal of trouble in going into any of the particulars which he found it necessary to do twelve months ago. By turning to the capital account, it would be seen that the entire money borrowed on mortgage and perpetual annuities amounted to £471,139 14s. 11d., and the outlay on the works up to July 1, was £451,387 12s. 6d., leaving a balance in hand amounting to £19,752 2s. 5d. The reason that they had such an amount of capital on hand was that, at stock-taking, they had only £6849 4s. 11d. of stock, as against £18,308 12s. 2d. last year. By the revenue account, it would be seen that the amount received for the sale of gas, after deducting discounts and bad debts, was £70,735 7s. 4d. The previous year it amounted to £66,000 odd, showing an increase this year, though the price was 4d. per 1000 feet less. The increase in the consumption of gas amounted to 49 million feet, or nearly 12 per cent. over previous years. It would be observed that the residual products last year amounted to £26,029, and this year the amount was £21,502 18s. 8d., which was greatly owing to a reduction in the price of coke. On the other hand, the items of expenditure would contrast most favourably with those of the preceding year. The balance carried forward to net revenue account was £29,166 2s. 3d., which, added to the balance from the preceding year's account of £13,915 1s. 5d., gave a total of £43,081 3s. 8d., leaving a balance to profit and loss account of £21,864 10s. 7d. By the balance-sheet it would be seen that there were accounts due for interest up to June 30, amounting to £3374 3s. 6d. The legal expenses amounted to £300. He thought it was a matter for sincere congratulation that, at the conclusion of the second year's possession of the gas-works, the corporation were able to show such a result as that presented by the accounts now before the council—a result which showed that, despite the depression of trade, unparalleled in its duration and intensity, they had really and truly made more money than in the year preceding. The quantity of gas made last year was 467,317,000 cubic feet, against 418,234,000 the year before, showing an increase of rather more than 10 per cent., or 49 million, resulting in a profit of nearly £8000, after paying every expense in the shape of interest, and keeping the works in efficient repair. It would be in the recollection of the council that the price of gas was reduced last year from 4s. 6d. to 4s. 2d. per 1000 feet. Every penny of that reduction represented a sum of £1500 net, so that they really dropped £6000 in their receipts. Then, concurrently with that, the price of coke was reduced 1d. per bushel, and that still further reduced the income by £4500, whereas all they got as a set-off was £6000, or 3s. per ton on 40,000 tons of coal. Besides this, there had been expended a large sum of money in keeping up the retorts and other perishable portions of the works, as would be seen by looking into the report so ably drawn up by their manager, Mr. Stelfox. They also paid, in round numbers, £1000 more interest than the year preceding, which, added to their loss by residuals of £4500, and £7949 9s. 2d. of profits, amounted to £13,449 9s. 2d., as against £11,000 the year before; for, of the sum then carried to the credit of profit and loss—namely, £13,915 1s. 5d., £2243 15s. 4d. belonged to a previous year, and £714 to premiums on shares, so that the full profit barely reached £11,000, as contrasted with that of £13,449 9s., already referred to. Every increase in consumption would, undoubtedly, pay an increasingly large per centage of profit; and if, by the means that he would refer to, they could get rid of their present method of borrowing money, cumbrous and expensive as it was, and if their consumption went on at the present rate per annum, he was safe in predicting a career of prosperity for the gas-works far beyond their most sanguine expectations. The committee had, therefore, decided on recommending a reduction in the price of gas this year of 3d. per 1000 feet, making the price 3s. 11d. instead of 4s. 2d., at which it stood last year. That would involve a lessened receipt to the extent of £4300; but against that, their saving in the price of coal would be £3500 on 40,000 tons at 1s. 9d. Having regard to the fact that they were obliged to commence their sinking-fund of close on £5000 per annum, and that it was a very possible contingency that the consumption of gas might fall off through the winter, owing to the mills either not running at all or for a short time only, he thought the committee exercised a wise discretion in not recommending a further reduction at present; though he frankly confessed that it was a disappointment to him to find himself compelled, by these and other considerations, to forego the pleasure of making the price 3s. 9d. instead of 3s. 11d. He hoped, however, that a further reduction of from 1s. 3d. to 1s. 6d. per ton in the price of coal would enable the committee to reduce the charge to 3s. 9d. next year. He held in his hand a report of a recent meeting of the Leeds Town Council, in which there was a notice given by the town-clerk of their intention to apply next session to Parliament for power to get rid of raising money by mortgages (as this council did now), and substituting therefor consolidated stock or Leeds consols. This method had been adopted in Bradford and Manchester with the most beneficial effects, and considering that the whole of their debt, exclusive of gas, would be little over £160,000, he maintained that their security was undoubted and first-class; for though the town of Leeds was not more than half as large again as Belfast, it had a debt of upwards of £3,000,000, or twenty times as large as theirs. He trusted this matter would not be lost sight of, as it would effect a saving of several thousands of pounds in their interest accounts. He came now to a highly important portion of the report, contained in the last paragraph, recommending the council to set aside, out of the two years profits, a sum of £20,000 as a contingent-fund, and carry forward the balance of £1864 10s. 7d. to next year's account. This contingent-fund would be equally at the disposal of the council in that shape, as it would be standing at the credit of profit and loss, to be applied to any purpose affecting the future of the gas-works, and was, in his judgment, a most necessary and desirable provision to meet the case of any sudden accident or emergency in conducting the works. Besides, it would suffice as a floating capital to carry on the business, and, by the saving it would effect in interest, indirectly hasten the reduction of the price of gas. He held a very strong opinion on this point, and, for his part, would never consent to apportion money made by gas to any other purpose than cheapening the price or bettering the quality. The great object of their becoming owners of the gas-works was to have the best possible quality of gas at the lowest possible price; for, much as he believed in good burners, he believed still more in good gas; and he was happy to say that, instead of keeping within the maximum standard, they had, throughout the entire year, far exceeded it, so that it had often been 18, and rarely 17, candles, while the standard to provide was 16 candles. It was also to be borne in mind that they would have to pay, in December next, their first instalment to the Bank of England, and that, coupled with their sinking-fund, was nearly £4000. This sum, with the cost of the hydraulic apparatus with which to deliver coal, would absorb one-fourth part of what now appeared as surplus capital, leaving £20,000 available for the purpose to which these sums were before applied. He was quite aware that this matter could be urged only on the grounds of prudence and sound discretion; but on both these grounds he commended it strongly for adoption. Referring to the last paragraph in the report, he remarked that for two years he had had, as chairman of the Gas Committee, ample opportunity of witnessing the zeal, ability, and efficiency with which their manager, Mr. Stelfox, had discharged his onerous and important duties. It was no small responsibility to place on anybody's shoulders; and, after due consideration, the committee decided on recommending the council to raise Mr. Stelfox's salary to £600, being an increase of £100 per annum. To this they thought he was well entitled, and it would be a graceful recognition on the part of the council of well-deserved merit, ability, and courtesy. Applications were sent in a year ago for increases of salary by the other persons mentioned in the list, Mr. Stelfox, the book-keeper, excepted, than whom there was no more efficient officer. His duties were increasing every year, and the committee thought him entitled to an increase. Some of the other persons he feared were not satisfied with the rate of their increase. The Messrs. Hamilton had, by length of service and fidelity and efficiency, entitled themselves to their proposed salaries, and he was told they were perfectly satisfied. The committee did not see their way to more than an advance of £10 each in the other cases; and when he informed them that the same class of servants were paid £10 less in Glasgow for doing more work, he thought the dissatisfaction of these men was very unreasonable. He must, however, add, that a more faithful, courteous, or obliging body of men did not exist than they had the good fortune to have in their service, and he felt sure that at all times the council would be disposed to treat them with every justice and liberality for the services they rendered.

Mr. E. H. THOMPSON, in seconding the motion, said he thought it must be highly satisfactory to the council that their purchase of the gas-works had been such a great success, and that it had led to a reduction in the price of gas.

After a brief conversation, the motion for the adoption of the report was put and carried.

It should be stated that the reduction in the price of gas in Belfast to 3s. 11d. is accompanied with discounts up to 20 per cent., which makes the net charge in many cases 3s. 6d. per 1000 cubic feet.

PUBLIC LIGHTING AT DEAL.—The directors of the Deal Gas Company have, as already stated, agreed to supply the public lamps of the town at 4s. 6d. per 1000, and they have now consented to sell the lamps, pillars, brackets, &c., to the corporation at a price to be fixed by two valuers, one chosen on each side.

ANDOVER PUBLIC LIGHTING.—A letter was read at the meeting of the Town Council of Andover, on the 2nd inst., from the secretary of the gas company, in answer to the resolution passed last month, requesting the reduction of the cost of the public lamps from £3 10s. to £3 each, stating that the directors had expressed themselves unfavourably to the resolution of the council, as the price tendered by the company left them no profit, and would compare not unfavourably with that of other towns similarly situated. It was resolved to call a special meeting of the council to consult with the directors.

DOVER GAS COMPANY.

The Half-Yearly Meeting of Shareholders was held on the 5th inst.—Mr. W. R. Mowll in the chair.

The reports of the directors, engineer, and managers, which were taken as read, were as follows:—

Directors Report.

Ladies and Gentlemen,—We have to report that on the 6th of July last we put up 200 new shares for sale by auction, which were all sold at a premium of 50 per cent. We find we shall still need upwards of £1000 to complete the payments for the gasholder and tank, which we shall raise by sale of a further number of shares when we require the money.

The contractor for the tank has proceeded with the work very much to our satisfaction, and the contractor for the ironwork is now doing his best to complete the holder within the time limited for the purpose. The destruction of the two old gasholders in Trevanion Street has compelled us for the present to revert to the scale of depreciation-fund, which we were advised to adopt in prospect of those works ceasing to be used for manufacturing purposes.

The reduction in price made on the 1st of January last has led to a largely increased consumption of gas, which will enable us to declare our usual dividend of 7½ per cent. per annum, which we, therefore, recommend you to declare accordingly.

At the ensuing meeting, Mr. William Rutley Mowll retires from office as a director, and Mr. Henry Hayward as auditor. Both gentlemen are eligible for re-election.

Engineer's Report.

To the Directors of the Dover Gaslight Company.

Gentlemen,—I beg to report that I visited your several works on the 16th inst., and found the whole of the buildings and apparatus in good condition. The usual repairs to retorts are being proceeded with, and all will shortly be ready for the winter's work. The purifiers lately erected at your Buckland station are in operation, and working satisfactorily. The new tank and gasholder in course of construction in Trevanion Street are progressing favourably.—I am, gentlemen, your obedient servant,

T. N. Kirkham.

Cambridge Villa, Gilston Road, South Kensington, Aug. 18, 1876.

Manager's Report.

To the Directors of the Dover Gaslight Company.

Gentlemen,—The increase in the consumption of gas has produced a good financial result for the past half year. The new purifiers have been in use for some weeks past. These, with the increased storeage for gas when the holder at the old works is completed, will enable you to manufacture gas more economically than heretofore, and we trust with more satisfaction to the public.—We have the honour to be your most obedient servants, Anderson and Jones, Managers.

Dover, Aug. 18, 1876.

The Chairman, in moving the adoption of the reports, said the directors met the shareholders with a great deal of pleasure, as they were able to report another successful half year's work. The favourable opinion which the public cherished of the continued success of the company was evidenced by the fact that the shares were sold at 50 per cent. premium. The erection of a new gasholder at Trevanion Street was proceeding rapidly; and the directors, having waited till the materials they wanted were as low in price as they probably would be for a long time to come, it would be built at a cost far below anything they had calculated upon. This was exceedingly gratifying, as every man of business knew very well that those who could carry on their business with the least amount of expended capital were those who could best sustain severe competition. Supposing a period should arrive when the company would be exposed to competition, the fact that the cost of their property had been less than that of their rival would enable them to compete successfully with any opponent. He did not anticipate any such eventuality; but, as the press were always represented at these meetings, it was as well that the fact should be communicated to the public. He was also able to report that the new purifiers were in operation, and so far as he could gather, they seemed to have answered the purpose expected of them. It would be remembered that when the lessees were a little hampered as regarded purifying power, there were periodical complaints of a smell from the gas-works at Buckland; but since the new purifiers had been erected no more smell had been emitted from their works than from any other works of a similar character throughout the kingdom. In other words, the nuisance caused by manufacturing gas at Dover had been reduced to a minimum. This half year the directors had reverted to their old scale in connexion with the deterioration-fund; and they felt justified in doing this, because a certain amount of capital had been sunk in the abolition of the old gasholders. He had little more to add, except to state the fact he was sure the shareholders would listen to with the greatest pleasure, that the directors would recommend the full statutory dividend of 7½ per cent. to be declared. He had noticed in the *Dover Chronicle* some remarks as to the relative price of gas at Dover and other places. Perhaps the writers of those articles were not aware that there were exceptional circumstances in connexion with each place, which affected, either favourably or adversely, the price at which gas could be supplied to the public; for instance, the price which the residuals would fetch in the market. Inland places, such as Maidstone, were surrounded by gentlemen's country seats, at each of which there was a greenhouse or a hothouse. What was the consequence? Coke, the most important article gas companies had to dispose of, fetched higher prices than at Dover; and the result was that the manufacturers of gas, making an increased profit out of their residuals, were able to sell the gas itself at a lower price. On inquiry, the directors found that the cases cited in the papers were quite exceptional, and the secretary had been good enough to obtain a statement of the price of gas in towns situated like Dover. At Folkestone the public paid 4s. 9d. per 1000, to be reduced to 4s. 6d. on Oct. 1, and 4s. 6d. per 1000 was charged for the gas supplied to the public lamps. At Hastings the charge to consumers was 4s. 7d., about to be lowered to 4s. 5d., and for each of the public lamps £5 a year was paid. At Canterbury the charge was 4s. per 1000, and £4 15s. a year for the public lamps; at Ramsgate, 4s. per 1000 to private consumers and for the public lamps, 7s. 6d. per lamp being paid for lighting; and at Deal the charge of 5s. per 1000 was proposed. And now they came to maligned Dover, where the company were said to be doing their work inefficiently as compared with other places. Here private consumers paid only 4s. per 1000, and a charge of £4 11s. 6d. a year was made for each public lamp, which included the cost of lighting. After this statement of facts he believed the people of Dover would see that he was justified in saying that the Dover Company had managed their business as well as the companies in adjacent towns.

Mr. E. Bottle seconded the motion, which was put and carried.

Mr. R. H. Jones moved that the chairman, who retired by rotation, be re-elected a director. Mr. Mowll had been associated with the company for many years past, during which time a great deal of difficult work had fallen on his shoulders, and it would be, to say the least, very ungrateful if the shareholders did not re-elect him.

Mr. Stone seconded the motion, which was carried.

The Chairman said he was grateful to the shareholders for the compliment they had paid him by their unanimous vote, and he was especially obliged to Mr. Jones for initiating his re-election. In days that were past, they had not been able to see altogether with the same eyes; but, in the consciousness that the company owed a great deal of their prosperity to Mr. Jones, the directors, when they decided to terminate the lease, felt it was due to him that he should be offered the management of the company, and they were pleased to find that he received the offer in the spirit in which it was made. He believed they were addressing him in good faith, and he accepted their proposals in good faith. He felt that the directors had met him not illiberally, while doing justice to the public at large; and there was little doubt that, when the new state of things came into operation next July, the company, under the energetic and earnest management of Mr. Jones, would have before them a career of prosperity equal to, and they might venture to hope greater than they had had in previous years. One great point would be that the inhabitants of Dover would understand that only one profit was made in the manufacture of the gas.

On the motion of the Chairman, seconded by Mr. Mannering, Mr. Henry Hayward was re-elected auditor.

Mr. Fielding, in moving that a sum of money should be voted to the directors for their past services, said he wished it to be understood that the resolution did not emanate from the directors in any way. He was only astonished that it did not, for he knew no reason why the directors, more than others, should serve them for nothing. In some towns £200 or £300 a year were paid to the directorate. At Dover the directors had not so much to do as in other towns, the works being in the hands of lessees, but still the business of the company occupied a great deal of their time. Ten years ago there were 11 meetings a year, but for the last four years the average number had been 23. As to the services rendered, the votes of thanks passed year after year were ample proof that they were appreciated by the shareholders. If anything more were required he could point to the present position of the company. The shares were now at a premium of 50 per cent., and the dividend was 7½ per cent., the utmost the law would allow. It might not be known by those present that 20 years ago the shareholders passed a resolution that the directors should divide among themselves the sum of £25 a year for their services, but with the exception of one gentleman, who lived away from Dover, and had consequently travelling expenses to pay, the directors had never availed themselves of that resolution. At the present moment the company had in their coffers £400 or £500 in hard cash available for the purpose he suggested. Besides that there was a sum of £3600, surplus profits, which profits accumulated at a time when the dividend was only 6 or 6½ per cent., and might have been added to the dividends, but the directors thought it right to have a surplus fund to fall back upon in case the profits in any half year did not provide a sufficient dividend. The shareholders were entitled to draw substantially in this £3600, but the sum he proposed they should award to the directors was, comparatively speaking, very small. His motion was as follows:—"That a sum of £200 be paid to the directors as an acknowledgment of their past services, to be divided between them in proportion to the time they have severally occupied seats at the board." The chairman had been a member of the board for 11½ years, more than double the time any member had served, and he had, therefore, so worded the resolution, that the remuneration would be distributed in proportion to the services rendered. He hoped the resolution would be carried unanimously, for he knew that the great body of the shareholders were fully convinced of its justice and desirability.

Mr. R. H. Jones seconded the motion, remarking that he must be acquitted of all foreknowledge, as he only heard a few hours ago that it would be proposed.

The motion was carried unanimously.

The Chairman, in the name of his colleagues, thanked the shareholders most heartily for this further evidence of their confidence, and this further proof of their appreciation of the intelligence they believed them to have brought to bear on the conduct of the officers of the company. It would be false modesty if he were not to utter the conviction he felt that this money had been earned. They had not ten miles to go to find another company working on all fours with their own, and he ventured to say they got their own work done for less than half the cost. This had arisen mainly from the fact that the directors were convinced the time would come when they would be able to go into the matter of making more advantageous terms. And having taken care to do no injustice to the lessees by remunerating them for the extra cost they were put to through not having the full storeage capacity which they would have liked to have had, and which they needed in order to manufacture gas at the greatest profit, they bided their time, and they would now get the work done at a saving to the company of upwards of £3000. As in that matter alone they had saved the company £3000, he and his colleagues felt no hesitation in sharing the £200. Many just men had been ostracized for being bold enough to be just, and he was not sure that what they had done would be approved. It was, therefore, additionally gratifying to them to receive this mark of continued confidence.

Mr. S. N. Larkins, sen., said £200 was a round sum of money. Would the directors be prepared to give it back if anything serious should happen?

Mr. Bottle: We do not anticipate anything serious in our time.

Mr. Fielding mentioned that he had received a great number of proxies from the most influential shareholders. He did not suppose that the directors would have used them, but it was as well that the fact should be known.

The proceedings terminated with the usual compliment to the chairman.

MANCHESTER CORPORATION GAS SUPPLY.

The Monthly Meeting of the Manchester City Council was held on Wednesday, Sept. 6—the Mayor (Alderman Curtis) presiding.

The Gas Committee presented their report for the past year, together with an abstract of the accounts of the department. From the report it appeared that the rental for the past year (including meter-rents) amounted to the sum of £334,330 3s. 3d., being an increase of £8223 19s. 7d. The profit was £101,232 4s. 6d., as against £106,807 6s. 5d. in the previous year, and is appropriated as follows:—Interest on loans, £16,185 10s. 8d.; set aside and transferred to capital account towards liquidation of the mortgage debt, £28,070 2s. 5d.; portion of surplus payable to the improvement department, £39,410 17s.; reserved by the committee towards repayment of advances made to the improvement department, in anticipation of profits, in accordance with the arrangement sanctioned by the council on March 4, 1868, £17,565 14s. 5d., and leaving still owing, as part of such advances, £8891 15s. 10d. The number of consumers had increased 2·85 per cent., amounting now to 69,263, as against 67,343 the previous year. The quantity of gas supplied had amounted to 1,972,696,000 cubic feet, being an increase of 94,305,000, or 5·02 per cent. over the previous year. The committee state that they have had under consideration the question whether it is desirable to make any, and, if so, what alteration in the prices charged for gas, and have resolved to recommend the council to authorize the changes mentioned in the recommendation subsequently moved by Alderman King. The adoption of these recommendations will reduce the many varieties of price now prevailing to three only—viz., to 3s. 4d. within the city, 3s. 10d. beyond the city, and 4s. 6d. beyond the river Mersey and the district of New Moston.

With reference to the question of deposits, the committee remark that, in their report of the 21st of February, 1873, they informed the council that they had considered the question which had been raised as to the propriety of paying interest on deposits for securing gas-rentals, and that, for the reasons then given, they did not deem it advisable to recommend such payment. The question having since been frequently revived, had again had further careful consideration, and the committee remark that they see no reason to doubt the correctness of the opinion already expressed, that the depositors have no real cause of grievance, when due consideration is given to the facts; amongst others, the cost of keeping the deposit accounts, that the persons from whom a deposit of 5s. is required constitute four-fifths of the whole number of depositors, and that they, being the smallest, have their gas at the same price as the largest consumers, and also that the payment of interest would entail additional expense and trouble. The committee state that they have, however, come to the conclusion that it is desirable to adopt an arrangement for the payment of interest in the way hereafter suggested, as the question, although small, affects a great number of people, of whom few get to know the reasons that have influenced the committee. This produces con-

stant irritation in the minds of the depositors, the effect of which is not compensated for by the amount of money which the change now recommended involves. The committee, therefore, propose to pay interest at the time of withdrawal of such deposits as may remain in their hands for twelve calendar months from and after Dec. 31 next, and for every additional complete twelve calendar months. The interest to be 3½ per cent.; or on 5s., 2d. per annum; 10s., 4d. per annum; 20s., 8d. per annum, &c., being the nearest even money that does not exceed 4 per cent., the rate which the corporation pay for borrowed money.

Appended to the report of the committee is the report of Mr. J. Leigh, consulting chemist to the corporation, who states that the gas has been tested photometrically at the Gaythorn and at the Rochdale Road stations almost daily. The standard of comparison adopted has been the light of a London standard sperm candle, burning at the rate of 120 grains per hour. The gas has been tested daily for sulphuretted hydrogen and for ammonia. It has also been allowed to flow continuously through test solutions, and the amount of impurity in large volumes of the gas has been determined. As the gas has passed through these solutions during each night, and during Sundays as well as on ordinary days, any negligence in purification at these times could have been detected. To the daily tests the gas has very rarely yielded any traces of sulphuretted hydrogen. From the large volume of gas flowing through the test solution (from 200 to 400 cubic feet per month), rarely has any of this impurity been separated, and in any case not more than a small fraction of a grain. The quantity of ammonia in the gas at Gaythorn station has averaged about one-third of a grain in 100 cubic feet, the maximum quantity having been 1·1 grain. At Rochdale Road station, in consequence of the improved mode of condensation, the quantity of ammonia in the gas has been scarcely appreciable. The gas has been fairly free from naphthaline, and from oily and tarry matter. The quantity of sulphur existing in the gas in combination with carbon, as bisulphide of carbon and organic sulphur, has been as usual, from the unequal quantity of sulphur contained in different coals and cannels, variable in amount. The general range, however, has been below that found in works where coal alone is carbonized for the production of gas. The large condenser between the hydraulic main and the washers and scrubbers, which the committee have completed at Rochdale Road station since the last report, will allow of experiments being continued with a view to the reduction of this impurity.

The auditors report states that the expenditure on capital account during the past year has amounted to the sum of £35,053 4s. 2d., the particulars of which are given in the summary of receipts and expenditure, and in the statement of assets and liabilities.

Alderman KING moved the adoption of the minutes of the Gas Committee, and, in doing so, referred briefly to the loss which the corporation had sustained through the death of Mr. Peacock, the indoor superintendent of the gas department.

Mr. GRIFFIN thought that the public would learn with some satisfaction the decision of the Gas Committee to allow interest on gas deposits.

Alderman KING said the resolution was that interest should be paid at the time of the withdrawal of such deposits as might remain in their hands for twelve calendar months from and after the 31st of December, and for every additional completed twelve months, at the rate of 3½ per cent.—that was to say, on 5s., 2d. per annum, on 10s., 4d., and so on, that being the nearest even money that should not exceed the 4 per cent. rate at which the council borrowed their money. He thought the public would have no further ground for grumbling. Indeed, the committee had removed the only remaining grievance which gentlemen could take up in anticipation of the 1st of November.

The minutes were confirmed.

Alderman KING, chairman of the Gas Committee, moved the adoption of the following recommendation of that committee:—"To authorize the committee, from and after the 25th of December next, to reduce the price of gas as follows:—Within the city to the uniform rate of 3s. 4d. per 1000 cubic feet, instead of 3s. 6d. and 3s. 5d., the latter being the price charged to consumers of 500,000 cubic feet in one quarter. The rates outside the city, excepting New Moston and places beyond the river Mersey, will be reduced from 4s. 2d. and 4s. 1d. to 3s. 10d. uniformly per 1000 cubic feet; and in the district of Cheadle from 4s. 10d. and 4s. 9d. to 4s. 6d.; Northenden, from 5s. 4d. and 5s. 3d. to 4s. 6d. uniformly; New Moston, from 5s. 10d. and 5s. 9d. to 4s. 6d. uniformly; and Droylesden, from 4s. 8d. to 3s. 10d., without any deduction for early payment." He said it was not always that the chairman of the Gas Committee could come before the council with so easy a mind as to the reception of a report as on the present occasion. The gross profit during the past year was £101,232, against £106,807 in the previous year. The council were aware that last year they raised the price of gas, and, of course, could not expect the same revenue this year. When the committee came to consider the prospects of income next year, it appeared to them that they might safely make a reduction, and, therefore, they had adopted the scale which had been laid before the council.

Alderman LAMB seconded the resolution.

The recommendation of the committee was adopted.

MARRIOTT'S IMPROVEMENTS IN GAS PURIFICATION.

Mr. William Marriott, of Huddersfield, manufacturing chemist, has recently patented a process for the purification of coal gas, by means of a solution of ammoniacal liquor or of sulphide of soda or other salts.

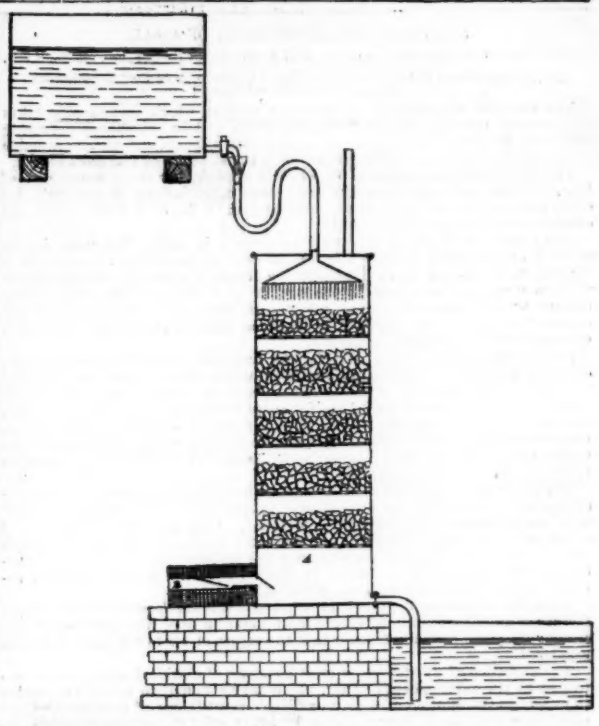
From the specification just published, we gather the subjoined information in relation to the process.

The impurities in gas obtained from the destructive distillation of coal are principally carbonic acid, sulphuretted hydrogen, ammonia, and certain other sulphur compounds, the composition of which is not at present well understood. Some of these impurities are partly removed by scrubbing the gas with ammoniacal liquor or water, and thence passing the gas through hydrate of lime or hyarated peroxide of iron to separate carbonic acid and sulphuretted hydrogen. The ammoniacal liquor, soda, potash, or lime in solution, is so treated by the invention under notice as that they are converted into sulphite or bisulphite, and in this state they will remove the whole or nearly the whole of the impurities present in crude gas.

Ammoniacal or gas liquor is chiefly a weak solution of carbonate and sulphide of ammonia, varying in the proportions thereof with the strength of the liquor, but containing more carbonate than sulphide of ammonia. When sulphurous acid gas is passed through gas liquor, the sulphide of ammonia is decomposed, sulphur being precipitated. When all the sulphide of ammonia in the gas liquor is decomposed, the liquor no longer discolours lead solution, which is therefore used as a test in this operation. If the passing of sulphurous acid gas into the gas liquor is still further continued, the carbonic acid is next expelled, and all the ammonia is converted into sulphite of ammonia. If more sulphurous acid is now added, the sulphite of ammonia is converted into bisulphite.

The accompanying drawing, which represents apparatus for the conversion of gas liquor into sulphite or bisulphite of ammonia, will assist in explaining this operation. This apparatus, however, although convenient for the purpose, forms no part of the invention of Mr. Marriott.

A is a tower charged with coke, or other suitable material, down which tower the gas liquor is allowed to percolate; B is a burner for burning sulphur, the sulphurous acid from which passes up the said tower. A slight draught or current up the tower is produced by a steam jet, or by a chimney. By regulating the flow of gas liquor down the tower according to the quantity of sulphurous



acid passing up the said tower, the gas liquor may be all converted into sulphite or bisulphite of ammonia, as required. This operation will be completely under the control of the attendant, and there need be no loss of sulphurous acid.

The method of using the sulphite, or bisulphite of ammonia, or prepared gas liquor, to separate the sulphuretted hydrogen and ammonia from crude gas is thus described:—

The crude gas is passed up apparatus called scrubbers, which apparatus is in general use in gas-works, while the prepared gas liquor percolates downward through the same. Immediately these two substances—namely, the prepared gas liquor and the crude gas—meet each other, the sulphuretted hydrogen of the crude gas is decomposed, and sulphur is precipitated. The prepared gas liquor is pumped repeatedly through the scrubber, until it no longer decomposes sulphuretted hydrogen, when it is replaced by a fresh quantity of prepared gas liquor.

The exhausted prepared gas liquor, which contains a quantity of sulphur in suspension, must be allowed to settle, when the solution can be drawn off from the precipitated sulphur, and again passed down the tower, A, to be re-saturated with sulphurous acid. Any scrubber which exposes a large surface to the gas, and offers little obstruction to its passage will answer the purpose. The size and number of the scrubbers must be in proportion to the quantity of gas to be passed through them in a given time; but this is a matter which must be left to the discretion of the engineer. Three scrubbers are required to afford the proper capacity for purifying the gas generated. Down the second or middle scrubber, the prepared gas liquor is passed by means of a pump, as it comes from the tower, A. This liquor, as it leaves the second scrubber, is again passed down the first scrubber, and then down the third scrubber, so that the prepared gas liquor passes down all three of the scrubbers. It is then pumped through the tower, A, to be resaturated with sulphurous acid, and again through the scrubbers, the process being continuous with the same quantity of prepared gas liquor.

The points which require the principal attention of the gas engineer are—first, that the proportion of crude gas to the prepared gas liquor is such that all the duty or effect shall be obtained from the prepared gas liquor before it is again passed down the tower, A; and, secondly, that the prepared gas liquor runs from the third scrubber in a neutral state. Attention to these points will ensure that no sulphurous acid brought by the gas current from the first or second scrubber leaves the third scrubber. The gas is finally passed through a lime purifier to separate the carbonic acid. As this process decomposes the sulphuretted hydrogen, no nuisance arises on emptying the lime purifiers. As the bisulphite of ammonia decomposes with the sulphuretted hydrogen, part of the sulphur forms fresh sulphur compounds, principally hyposulphite and pentathionate of ammonia, but these compounds do not prevent the solution from again absorbing sulphurous acid, or the renewal of its property of decomposing sulphuretted hydrogen.

When the gas contains ammonia, this substance is absorbed in the scrubbers, and will accumulate in the prepared gas liquor, so that after a time there will be more liquor than is required. When it is desired to work up this excess of ammonia or renew the solution of prepared gas liquor, the whole of the sulphur contained therein may be recovered by adding to the liquor the quantity of sulphuric acid required to saturate the ammonia; this liberates sulphurous acid, and the same may be utilized by passing the liquor down the first scrubber, where the sulphurous acid decomposes with a further precipitation of sulphur. The solution, after depositing the sulphur, may be evaporated and crystallized into sulphate of ammonia. The inventor states that, in the course of his experiments, he has found that sulphur compounds, other than sulphuretted hydrogen, are removed at the same time; but as this result is uncertain, he makes no claim under that head.

The precipitated sulphur from the exhausted liquor (that is the liquor when it no longer decomposes sulphuretted hydrogen) is recovered in a marketable form by a process which consists in introducing the precipitated sulphur into a boiler, and heating the same by steam up to 230° Fahr., at which temperature sulphur is liquid; and the sulphur, being much heavier than the solution in which it is precipitated, accumulates at the bottom of the boiler, and is thence discharged into shallow vessels to cool. As all the sulphur existing in sulphuretted hydrogen in the gas is recoverable, there is a much larger quantity produced at any works than will be required for generating the sulphurous acid necessary to convert a given quantity of gas liquor into sulphite of ammonia. Soda, or potash, or lime may be converted into sulphite or bisulphite, in the manner above described, for converting the ammonia of gas liquor into sulphite or bisulphite, and the sulphite or bisulphite of soda or potash, or lime may be used for separating the sulphuretted hydrogen from the crude gas.

SPONTANEOUS COMBUSTION OF COAL.

By FREDERICK AUGUSTUS ABEL, Esq., F.R.S., and JOHN PERCY, Esq., M.D., F.R.S.

[A paper published in the report of the Royal Commission on the "Spontaneous Combustion of Coal in Ships."]

The so-called spontaneous development of heat which occasionally takes place in coal is due to chemical changes which certain substances occurring in it undergo through the agency of atmospheric oxygen, and which are liable to acceleration by some conditions attending the storeage or transport of coal.

The substances, the oxidation of which is attended by the development of heat, are iron pyrites (and possibly some other combinations of sulphur), and some carbo-hydrogen compounds, forming part of the coal itself, which are comparatively readily oxidizable.

Iron pyrites is of almost universal occurrence in coal. The condition in which it exists differs considerably in different kinds of coal; in some it is distributed so as not to be detectable by ordinary inspection; in others it is in form of more or less conspicuous laminæ of a brass yellow colour; occasionally, small distinct crystals of cubical form and bright metallic lustre are observed, and not unfrequently it is found in nodules (known as "brasses") and layers of considerable dimensions.

Iron pyrites, a compound of sulphur and iron known as disulphide of iron, occurs in the mineral kingdom in two crystalline forms, which are identical in chemical composition. Pyrites vary greatly as regards their stability or their liability to undergo oxidation by contact with the atmosphere. Some, after remaining unchanged during long periods of exposure, will undergo oxidation without any immediately apparent inciting cause. Others are perfectly stable, and with others, oxidation follows with more or less rapidity upon their exposure to the atmosphere.

The presence of moisture in air promotes the oxidation of pyrites; it does so apparently by bringing the atmospheric oxygen into more intimate contact with the surfaces of the oxidizable material. Similarly, the absorption of moisture by mineral substances of laminated or porous structure, through which pyrites are disseminated, promotes the oxidation of the latter by bringing the atmospheric oxygen, which is dissolved by the water, into more intimate contact with the oxidizable material.

Thus, the oxidation of pyrites in alum schist is accelerated, in the manufacture of alum therefrom, by occasionally watering loose heaps of the mineral, which are piled in such a manner that the access of air to the interior can be regulated.

The oxidation of pyrites (as in most instances of chemical action) is accompanied by the development of heat, which may accumulate to such an extent as to lead to the ignition of highly oxidizable constituents of minerals through which it is distributed. Heaps of alum schist, exposed to the air and moistened, will become heated to an extent to lead to the ignition of the carbonaceous constituents of that mineral; and similarly, coal, through which pyrites are disseminated, may become heated to the point of ignition by the oxidation of pyrites disseminated through it.

Sulphur exists in coal in other forms of combination than that of iron pyrites. Thus sulphate of lime is occasionally disseminated through coal; the existence of sulphur in this form cannot give rise to the development of heat, as it is already in the completely oxidized or burnt condition; however, so far as is known, they have not been found to possess any liability to spontaneous heating by oxidation. Some descriptions of coal or shale have been found to contain sulphur in somewhat considerable quantity in combination with carbon and hydrogen. An example of this is furnished by the so-called "resiniferous shale" occurring in Tasmania, which has been found to contain as much as 5 per cent. of sulphur in combination with carbon and hydrogen.

So far as is at present known, the spontaneous heating of coal is not ascribable to any tendency of such sulphur combinations to oxidation by atmospheric agency.

Pyrites appear, therefore, to be the only sulphur combinations occurring in coal which by their oxidation, promoted by the presence of moisture and by mechanical conditions favourable to the accumulation of the heat developed by such oxidation, are liable to give rise to the so-called spontaneous ignition of coal.

Coal varies considerably not only in chemical composition, but in structure, some varieties being comparatively open and porous, others compact or laminated, and very friable or readily broken up.

Carbon in a finely divided or porous condition has the property of absorbing and condensing within its pores large volumes of certain gases, among which is oxygen.

Thus, wood charcoal which has been recently produced, or which has been freshly heated sufficiently to expel moisture and gases which it may have absorbed, will condense within its pores more than nine times its own volume of oxygen, and seven times its own volume of nitrogen, which it is capable of absorbing by exposure to the air.

The condensation of a gas by a porous body is attended by the development of heat, proportionate to the extent of that condensation. Moreover, the tendency to oxidation which carbon, and certain carbon compounds existing in such a substance as charcoal, possess, is favoured by the condensation of oxygen within its pores, whereby the very intimate contact between the carbon and oxygen particles is promoted. Hence the development of heat and the establishment of oxidation occur simultaneously; the latter is accelerated as heat accumulates, and chemical action is thus promoted, and may, in course of time, proceed so energetically that the carbon or carbo-hydrogen particles may be heated to igniting point.

A good illustration of this action is afforded by the very porous charcoal prepared for the manufacture of gunpowder. It has to be protected against rapid access of air for some considerable time after it has been removed from the carbonizing retorts (by transferring it at once from the retorts to metal receptacles, which are kept tightly closed for a number of days), otherwise the charcoal, though it may have been allowed to cool down perfectly, will speedily become heated upon exposure to air, by the action above explained, to such an extent as to ignite spontaneously. Even after the stick charcoal no longer exhibits any tendency to heating when exposed, its pulverization by grinding has still to be delayed; otherwise, when the absorption and condensation of oxygen by the internal portions of the pieces of charcoal become favoured by the reduction of these to a fine state of division and the consequent exposure of large surfaces to the air, ignition of the charcoal will take place. (Instances of such ignition upon the mill-beds at powder-works are not unfrequent.)

The spontaneous ignition of oiled cotton or silk waste, or cloths, which is of not unfrequent occurrence, affords another illustration of the manner in which the heat developed by the action of atmospheric oxygen upon readily oxidizable substances, consisting chiefly of carbon and hydrogen, which are exposed to that action under conditions very favourable to it, will readily accumulate to an extent sufficient to give rise to ignition. The porous cotton or silk waste serve, in such cases of spontaneous ignition, as vehicles for exposing the readily oxidizable oil or grease in a finely divided condition to the air, and thus favouring its rapid oxidation.

The foregoing explanation of the manner in which the spontaneous heating and eventual ignition of certain carbonaceous substances, by the action of atmospheric oxygen, are brought about, has a direct bearing on the spontaneous ignition of coal. The more porous and readily oxidizable portions of coal, which are known to be more or less largely disseminated through seams from different localities, undergo oxidation by absorption of atmospheric oxygen, and by the exposure of large surfaces to its action, and the heat developed by that action will accumulate, under favourable conditions, to such an extent as soon to hasten the oxidation and the consequent elevation of temperature, until some of the most finely divided and readily inflammable portions actually become ignited.

The breaking up of the coal, which occurs for a more or less considerable extent before and during its shipment, obviously favours the absorption of oxygen, and consequently increases a tendency to heating by the action above described.

In a series of valuable experiments on the weathering of coal, by Richters and others, it has been demonstrated that a considerable quantity of oxygen is absorbed by freshly-gotten coal, and that carbonic acid and water are evolved from such coal after absorption of oxygen, while a portion of the oxygen absorbed is fixed by the formation of some solid oxygenated compound in the coal. Spontaneous oxidation of coal by the oxygen absorbed from the air is, therefore, satisfactorily established, and is unquestionably one, if not the chief, cause of the spontaneous heating of coal.

Spontaneous ignition of coal, when due to the oxidation of the porous and readily oxidizable carbonaceous substances occurring in coal, does not appear to be favoured by the presence of water in the coal, or by its access to a cargo; on the contrary, these portions, by becoming wet, would have their pores more or less filled with water, and their power of absorbing oxygen would be proportionately diminished; hence the presence of water must be antagonistic to the oxidizing action of the latter in many instances, though, when iron pyrites is present, it may promote or accelerate spontaneous heating, as already pointed out.

The gases which are occluded (or confined in a more or less condensed condition) in coal, vary considerably in quantity and composition in different kinds of coal, and they also gradually undergo various changes in composition by exposure, or keeping of the coal.

Their chief inflammable constituent is marsh gas, and it is to the admixture of this gas with a considerable volume of air that explosions are due in freights or stores. In pits where explosions are liable to occur, the gas escapes either with more or less rapidity and force from fissures ("blowers"), or gradually from the freshly exposed surfaces of coal seams. When coal from such pits is brought to the surface, it continues slowly to evolve inflammable gas for some time afterwards, especially if the coal be in large masses, or stored in compact heaps.

If facility is not afforded for the ready escape, or removal into the open air, of the inflammable gas emitted from the coal, composing a cargo or contained in bunkers, on board ship, the spaces between the masses of coal, or any partially confined spaces not occupied by the coal, but in close proximity to, or communication with it, will, in time, become filled with a mixture of the gas with the air in those spaces, which, unless the former be present in very small proportions, would explode on the approach of a flame to it, and with a violence depending upon the proportion which the air bears to the inflammable gas which has become diffused through it.

As the application of flame (or of a body raised to a high red heat) is indispensable to the ignition of mixtures of air with the inflammable gas evolved from coal, it is obvious that explosions cannot occur spontaneously from this cause on board ship, but must be brought about by the accidental or incautious approach of a light to localities where the coal is stored, or where the explosive mixture is likely to penetrate.

If coal, from seams which are charged with marsh gas, is placed on board ship shortly after being raised from the pit, there is obviously great liability to the formation of an explosive atmosphere in the hold or bunkers, or spaces communicating with them, and every possible means should in such cases be had recourse to for facilitating the escape of gas from the coal into the open air.

But, as the gas requires a large admixture of air to render it violently explosive, it is obvious that any attempt to ventilate the coal by passing or drawing air into the body of the freight would be most likely to favour the production of a violently explosive mixture of gas and air. The only useful application which might be made of any special means of ventilation with a view to diminish the risk of explosions would be to pass a current of air over the coal and immediately into the open air, so as to accelerate the escape and removal of the inflammable gas.

As regards the application of ventilation, with a view to reduce the liability to spontaneous ignition of a cargo of coal, the only useful object which could possibly be aimed at by ventilation, would be the rapid abstraction of heat developed in the coal (by chemical changes set up as described), by causing cool air to circulate freely and rapidly throughout the body of a mass of coal. The attainment of such a result, even by powerful means of artificial ventilation elaborately applied, and with the coal in the mechanical condition most favourable to its free permeation by air, appears, to say the least, very doubtful, and there can be no question that any system of ventilation practically applicable on board ship, would fail to attain such a result, even disregarding the fact that the mechanical (finely divided) condition of much of the coal constituting a cargo is quite antagonistic to the free passage of air through its mass.

It does not appear practicable, therefore, to apply ventilation with any prospect of guarding against the accumulation of heat in some portion of a cargo of coal.

Such circulation of air as may be established even in the less compact portion of the cargo, is not likely to have any valuable cooling effect, and the circulation, if there be any, must be very feeble among the more closely lying masses of small coal, so that heat, if developed in these, will accumulate undisturbed. Indeed, its development would possibly be favoured by the fresh supply of oxygen, which a gradual replacement of the air surrounding those parts would convey, so that a period would be reached, sooner or later, when the development of heat would be most seriously promoted by ventilation, some time before actual ignition demanded the total exclusion of fresh air.

The evidence which has been submitted to the committee on the subject of the ignition of coal cargoes bears out generally the conclusion to which the above considerations lead—namely, that it is inadvisable to attempt through ventilation of cargoes in coal-laden ships.

ILKESTON WATER SUPPLY.—At the monthly meeting of the Ilkeston Local Board, on the 5th inst., the clerk reported that he had written to the directors of the Ilkeston Water-Works Company, informing them that the board had agreed to purchase the plant of the company at the rate of 22s. per share for 6850 shares, the price at which the directors had previously agreed to recommend the shareholders to sell. A letter was also read from the directors, stating that a shareholders meeting had been held, and it had been unanimously resolved not to accept the offer of the board. A lengthy discussion followed, and an opinion was expressed that unless the water-works were in the hands of the board the town would not be properly supplied, and that the only course now before the board was to take steps with a view to constructing water-works of their own. Ultimately it was proposed that the clerk be instructed to write to the Local Government Board, with a view to obtain for the board at Ilkeston power to construct water-works of their own for the supply of the district. It was urged against this that the water-works company were prepared to extend their works and to meet the demands of the town, and an amendment was submitted, but not seconded, that the water question be postponed for twelve months, to give the company an opportunity of extending their works and providing for the more efficient supply of water. On a show of hands the motion was carried.

IRON AND COAL TRADES OF SHEFFIELD, SOUTH YORKSHIRE, AND NORTH DERBYSHIRE.

(FROM OUR OWN CORRESPONDENT.)

The dulness of trade is, for the most part, wholly unrelieved—a fact which is proved to ample demonstration by the Board of Trade returns, issued on Friday morning. These returns show that, during the month of August, our exports of pig iron were 77,823 tons, as compared with 91,945 tons in the same month of last year; of bar and angle iron, 17,496 tons, against 22,824 tons; of railroad iron, 50,906 tons, against 61,078 tons in August last; whilst of "cast or wrought" iron, we sent off 21,774 tons, or about 500 tons more than during the same month of 1875. In all cases the falling off in values is much greater than the diminution in quantities.

In this locality there has been very little change in any respect which would be of interest to the readers of this JOURNAL. Pig iron continues to change hands in small parcels at easy quotations, the make being still rather more than up to the requirements of the district, which, together with the heavy stocks held elsewhere, tends to keep down prices. The larger foundries are fairly well employed, as previously recorded.

The Staveley Coal and Iron Company, Limited, have just issued their annual report. The capital of this company, I may say, is about £1,300,000, and the property includes a number of collieries, in addition to large iron-works, within a few miles from Sheffield. The directors report a profit altogether reaching £136,000, out of which they recommend a dividend at the average rate of 5 per cent. They state that the recent great development of the iron and coal trades has brought, and will inevitably bring, about a greatly increased competition in those trades, the producing powers of which are already much beyond the requirements of the country. They do not fear, however, that their own undertaking will not continue to show favourable results in comparison with concerns of a similar kind.

The coal market has not been much stronger during the week, although there has certainly been a better inquiry for house coals of fine quality for London, and of general sorts for local use. Steam coal is steadily quiet, much of the fairly good business now doing being for shipment to the northern ports, in order to anticipate the forthcoming closing of the navigation. Prices are as heretofore.

THE COAL AND IRON TRADES OF LANCASHIRE.

(FROM OUR OWN CORRESPONDENT.)

The coal trade of this district remains in much the same position as last reported, but the sudden change in the weather to cold and wet is causing rather more demand for house-fire descriptions of fuel, and the market is exhibiting a steadier tone. Prices, with very few exceptions, are firm at the full rates of last month; but sellers are unable to raise their quotations, and as, notwithstanding the production is at present very much restricted, supplies are plentiful, it is scarcely probable that any upward movement can be made for some time to come. Speaking generally, the better sorts of round coal are meeting with more inquiry than they were, and good burgy and slack are in fair demand; but common coal is still a drug, owing to the depression in the iron trade, and now that the brickmaking season is closing, another outlet for this description of fuel will be closed. The average pit prices in the Wigan district remain about 10s. to 11s. per ton for good Arley, 8s. to 9s. for common, 8s. 6d. to 9s. for Pemberton four-feet, 8s. to 9s. for screened gas coal, 6s. 6d. to 7s. for common coal, 5s. 6d. to 6s. for burgy, and 3s. 6d. to 4s. 6d. per ton for slack.

The colliers strike in the Oldham district has terminated, the men having gone in on the masters terms, and the Lancashire mining district is now generally free from disputes.

A special meeting of the shareholders of the Ebbw Vale Steel, Iron, and Coal Company, Limited, was held on Friday, at Manchester, to receive the report of the committee appointed at the annual meeting to confer with the directors as to the best means of strengthening the board, and to consider the position and future management of the company. The proceedings were of a rather stormy character. The committee, in their report, recommended that £200,000 or £250,000 additional capital should be raised to place the financial position of the company on a satisfactory footing, and the report was adopted.

The report of the Pearson and Knowles Iron and Coal Company, Limited, which is to be laid before the meeting of the shareholders to-day (Tuesday) states that the profits for the year have amounted to £56,000, out of which £18,777 have already been paid as an interim dividend, and a further dividend of 6 per cent. is recommended on the B shares, and the usual guaranteed 6 per cent. on the A shares, leaving £14,175 to be carried to the reserve-fund.

The iron trade continues very depressed, and the local makers are almost cut out of the market by the competition of Middlesbrough iron; but notwithstanding this they make no change in their quotations, which remain at 56s. to 57s. per ton for No. 3 foundry, and 55s. per ton for No. 4 forge delivered into the Manchester district. Finished iron shows no improvement, and although prices nominally are without change, there is a good deal of underselling to secure orders.

THE COAL AND GENERAL TRADE OF THE NORTH OF ENGLAND.

(FROM OUR OWN CORRESPONDENT.)

There was a good steady demand on the Tyne for the best and medium qualities of gas coals last week. The shipments at the Tyne Dock were heavy, and the turns at the shipping-places, if anything, were longer. There is no alteration in prices. The market, however, is dull for inferior qualities of coal, and the supply at the shipping-places continues in excess of the demand, and prices are rather lower. The steam coal trade is steady, but the demand is less active, and the collieries are rapidly working off the residue of the Baltic orders. Household coals improve somewhat in value. Small steam coals continue a drug in the market, and stocks are increasing, with a very poor prospect of a vend being found for them during the winter. The pits, as a whole, are working tolerably well.

During last week there was a good arrival of small sailing ships. A fair number of orders were in the market for the small ports, and small sailing ships were taken up at from 5s. 6d. to 6s. per ton to load coals for the East coast, 7s. per ton for Poole and the English Channel ports, and about £8 to £8 10s. for the French ports. Coasting business for steamers is as follows:—London, 4s. 3d. to 4s. 6d.; Rochester, 4s. 6d. to 4s. 9d.; Antwerp, 5s. 9d.; Dunkirk, 5s. per ton. Hamburg, £5 15s. to £6; Bordeaux, £3 5s. The demand for the Baltic is falling off, and the Mediterranean outward gas-coal trade is rather worse. The shipments of coal thence from the North are somewhat limited. A fair quantity of coke is being sent out to Spain.

The financial crisis still continues in the Cleveland iron district. In addition to Messrs. T. Vaughan and Co., the creditors of four other large Middlesbrough firms have been called to deliberate upon the position of affairs. The state of these concerns has been before the public, and it is quite likely that they will go into liquidation. The iron trade at Middlesbrough and the district must continue unsettled until these difficulties are got through, and business is re-established upon a somewhat sounder basis. The general trade of the Tyne and district was rather better last week. There was a slightly improved demand for chemicals, and the tone of the market was firmer. Some orders also came to the iron shipbuilding yards on the Tyne, which had a tendency to restore confidence. The engine trade has also improved.

TRADE NOTES FROM SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

The directors of the Ardrossan Gas and Water Company have resolved to reduce the price of gas from 5s. 10d. to 5s. per 1000 cubic feet, the rate of meter hire being continued, as hitherto, at 2s. 6d. per annum.

At their annual meeting, held a few days ago, the Sanquhar Gas Company declared a dividend of 5 per cent., on both ordinary and preference stock of the company, and the price of gas was reduced from 10s. to 8s. 4d. per 1000 feet.

The old Townhead Gas-Works, belonging to the Glasgow Corporation Gas Commissioners, were sold by public auction last Thursday. The competition was very brisk, and was taken part in by a large number of bidders. For each of the three telescopic gasholders, which formed the principal lots, the sum of £310 was paid. The two small gasholders sold at £38 and £40, the condensers ranging from £60 to £70, and the station-meters realizing £51, £39, £27, and £26, respectively. Cast iron realized from 52s. to 57s. per ton; malleable iron, from 82s. to 105s. per ton; and lead, 22s. 6d. per cwt. The building materials were also well sold.

The report upon the quality of the gas supplied to Greenock during last month, as determined at the town station of the Corporation Gas Commissioners, states that the maximum illuminating power was 29·88 standard candles, the minimum being 26·06 candles, and the average 28·01 candles. Twenty-seven experiments were made, and the average temperature of the gas while testing was 64·24 degrees Fahrenheit.

Dr. Wallace, gas examiner for the city of Glasgow, reports on the illuminating power and purity of the gas supplied by the Corporation Gas Commissioners for the week ending Sept. 2, 1876. The average illuminating power was highest at the Tradeston station—namely, 28·73 candles; the maximum at Dawsholm was 29·81 candles, 27·54 at Dalmarnock, and 28·97 at Tradeston. Sulphur was present in the Dalmarnock gas to the extent of 11·24 grains per 100 cubic feet, and the amount of ammonia was ·28 grains per 100 cubic feet.

The Dundee Gas Commission have just approved of a report by their manager, Mr. M'Crae, on the probable extension and requirements of the gas-works during the next seven years. It was estimated that something like £54,000 would be required to carry out the proposed works, and it was unanimously agreed to go to Parliament next session for powers to borrow that sum of money. Mr. M'Crae calculates that in seven years the consumption will have risen to 350 million cubic feet per annum, as against 280 millions last year; and the opinion has been expressed that, if the rate of consumption proceeds as it has done during the last six years, the annual consumption at the end of the next six years will be increased to 380 million cubic feet.

On Thursday evening the Police Commissioners of Largs held their monthly meeting, when the question of the water supply was up for consideration. It was stated that, if the commissioners agreed to carry out the Middleton water scheme in all its entirety, the Board of Supervision would place the powers of the local authority in their hands; and a letter was read from Mr. Skelton, secretary to the Board of Supervision, stating that the Police Commissioners had been appointed the local authority for the burgh. The commissioners unanimously agreed to accept the powers on the conditions laid down, and the clerk was instructed to request the Parochial Board to send them all documents and papers relating to the water scheme, and other matters relating to the local authority. A conversation arose as to the present state of the water scheme, and it was mentioned that one of the contractors had brought a large lot of plant, but the tenants of the land had not allowed him to put it on the ground until arrangements were completed with the proprietors and tenants.

At the last meeting of the Glasgow Corporation Water Committee, a good deal of discussion took place with regard to the propriety of testing and stamping water-fittings, and several speakers doubted if it would be any advantage to adopt the suggestion of the sub-committee.

It is intended to lay forthwith about 4½ miles of water-pipes, ranging from 18 inches down to 6 inches diameter, within the city of Glasgow.

The Glasgow pig iron warrant market was very steady during the past week, still there is very little disposition to do business, the position of the trade being most discouraging for buyers. Shipping iron is in abundant supply, and makers are all undersold by merchants. The demand is slackening off, and the season being so far advanced, there is small hopes of improvement. Manufactured iron is in rather better request for shipment, but the local trade is unchanged. The week closed on Friday with prices of pig iron at 56s. fourteen days, and 55s. 11d. cash, the close being—sellers, 56s. cash, and 56s. 1½d. one month; buyers, 1½d. per ton less.

Very little change is noticeable in the coal market. There is certainly more inquiry for house descriptions, and buyers, taking advantage of the present very moderate prices, are beginning to get in their winter supplies. The shipping department is quiet, yet vessels are scarce for some ports.

WALLASEY GAS SUPPLY.—It is intended by the Local Board of Wallasey to apply to Parliament next session for powers to extend the borrowing powers of the Gas and Water Committee.

ENNIS (IRELAND) WATER-WORKS.—At a meeting of the Ennis Town Commissioners held on Thursday last, it was resolved to establish water-works for the town, at a cost of £10,000.

RICHMOND (SURREY) GAS COMPANY.—At the half-yearly meeting of this company on the 31st ult., a dividend of 10 per cent. on the old, and 7 per cent. on the new shares was declared.

DERBY GAS COMPANY.—At the half-yearly meeting of this company on the 31st ult., a dividend of 10 per cent. per annum on the original shares, and of 7 per cent. on the new shares, was declared.

COMMITTAL OF A LADY TO PRISON FOR NON-PAYMENT OF GAS-RATES.—A distress warrant from the Canterbury Bench, against a Miss Hacker, for non-payment of the amount due from her to the Canterbury Gas Company, having been returned, marked "*nulla bona*," the bench, last week, committed the lady to gaol for one month.

OPENING OF THE POTSDAM WATER-WORKS.—The following telegram, dated Potsdam, Sept. 4, has been received:—"The new water-works for this town, constructed by an English company, have been successfully opened to-day in presence of the chairman, several of the directors, and a large number of municipal councillors and leading citizens of Potsdam."

PRESCOT GAS COMPANY.—In the course of a conversation at the Prescot Local Board, on Thursday last, as to the public lighting contract, the chairman of the board, who is also chairman of the gas company, explained that the latter were not in a position to make a reduction from 5s. 6d. per 1000 feet at present. Although the company were formed as long since at 1833, the last year was the first in which they had paid the full dividend according to Act of Parliament.

PUBLIC LIGHTING AT EASINGWOLD.—On Friday, the 1st inst., a meeting was held at the public hall, Easingwold, to determine the amount of money to be raised for lighting the streets with gas for the ensuing year. It appeared that last year the sum of £45 was allowed, and the inspectors made an arrangement with the gas company to light the streets at 6s. 8d. per 1000 feet as long as the money lasted, and the lamps were not lighted during the whole of the usual period. At this meeting the sum of £50 was proposed and carried, an amendment for a smaller sum being lost. Mr. William Morfoot, the retiring inspector, was re-elected, and the accounts of the inspectors for the past year were duly examined and passed.

GUISBOROUGH GAS SUPPLY.—At the meeting of the Guisborough Local Board on the 26th ult., complaints were made of the quality and price of the gas supplied by the gas company, and it was resolved that the clerk write to the secretary of the Guisborough Gas Company, with the view of ascertaining on what terms they are prepared to dispose of the gas-works, plant, &c., to the local board.

PROPOSED SALE OF THE BANGOR GAS AND WATER WORKS.—At the last meeting of the Bangor Local Board of Health, a letter was read from the Gas and Water Works Company, stating that the directors were prepared to recommend their shareholders to sell the undertaking of the company to the local board for the sum of £70,000. The consideration of the question has been adjourned until the 18th inst.

REDUCTIONS IN THE PRICE OF GAS.—At the meeting of the Manchester City Council on the 6th inst., it was resolved to reduce the price of gas at Christmas next from 3s. 6d. to 3s. 4d. In the out-districts corresponding reductions will be made. The Darlington Town Council, at their meeting on Thursday, decided to make the discount allowed to consumers 8d. per 1000 cubic feet, thus reducing the price of gas to 3s. net. At Leominster a reduction of 5d. per 1000 has been made. The Crystal Palace District Gas Company will reduce their price to 3s. 11d. at the close of the present quarter. At Birkenhead the commissioners are about to reduce the price 3d. per 1000 feet.

LEOMINSTER GAS SUPPLY.—At the monthly meeting of the Leominster Local Board on the 5th inst., a letter was submitted from the gas company, stating that the directors have decided to make a reduction of 5d. per 1000 feet in the price charged for gas to private consumers, and were willing that the price charged to the board for the public lamps should also be reduced—viz.: The long time lamps from 70s. to 65s. per lamp per annum, and the short time lamps from 40s. to 38s. per lamp per annum; the other conditions of the agreement between the company and the board to remain unaltered.

COWPEN WATER-WORKS.—On Thursday last the first sod of the water-works, for the supply of the district of the Cowpen Local Board, according to the scheme projected by that authority, was cut at Bebside, by Mr. John Hedley, chairman of the Cowpen Board. The scheme is considered a very satisfactory one, the supply of water being obtained from the lands of the Earl of Carlisle at Hepscott. There is a watershed on each side of the railway, and pipes will be put down for a mile and a half at each side of the line, then they will form a junction to be laid along the east side of the railway to the service reservoir, which is to be constructed on the Cowpen estate, Bebside Station, on land belonging to Mr. Henry Sidney. The water will thence be continued by pipes to Cowpen. Messrs. Young and Dodds, who are the contractors for the Bedlington Water-Works, are the contractors for the present scheme, for which a loan of £8500 has been obtained from the Public Works Loan Commissioners, repayable over thirty years, at 3½ per cent. interest.

THE LATE MR. PEACOCK, OF MANCHESTER.—At the meeting of the Manchester City Council on Wednesday last, Alderman King, in moving the adoption of the Gas Committee's minutes, referred to the loss the corporation had sustained by the death of Mr. Peacock, the indoor superintendent of the gas department. He said Mr. Peacock was connected with that department long before he (Alderman King) had a seat in the council, and ever since he joined the Gas Committee he had found Mr. Peacock a most admirable public servant. He was always eager to carry out, in all respects, the wishes of his employers, and was a man of singularly unselfish disposition. He (Alderman King) believed it was through Mr. Peacock's anxiety to work the last week or two of his life, when he was quite unfitted for it, that they had to lament his sudden decease. The council never lost a servant more able and worthy, or more honest and conscientious than the late superintendent.

GAS EXPLOSION AT SKIPTON.—The *Leeds Mercury* reports that on the afternoon of Monday, Sept. 4, at half-past five, an explosion took place on the premises of the Skipton Gas Company. The report was heard in most parts of the town. The Post Office and other public buildings were shaken to the foundations. Men and women in thousands immediately rushed to the premises of the gas company, and there found the engine-house and boiler-house blown to the ground. The boiler is greatly damaged, if not destroyed. Two workmen from Colne were badly burnt about the face, head, and hands. Doctors were immediately in attendance, and dressed the wounds of the sufferers. A third man was also injured. It was stated that the men had removed a nut or screw from a pipe which they were cleaning, when another person (at a distance) opened a valve, which caused a rush of gas, and it is thought the same became ignited in the retort-house, and hence the explosion. Several hundred pounds damage has been done.

DUKINFIELD SEWERAGE.—Major Tulloch, R.E., of the Local Government Board, held a preliminary inquiry on the 31st ult. with reference to certain complaints which had been made by the owner of the soil, as to a nuisance caused by the sewage from certain portions of the district being allowed to flow into the natural brook courses. In the course of the inquiry Mr. Cartwright, the surveyor of the board, produced a plan showing an outline sewerage scheme, by which it was proposed to collect and convey the whole of the sewage of the district to a point below the town, which was favourably situated for the construction of tanks and other works that might ultimately be required in the treatment of the sewage; the estimated cost, exclusive of land, was £25,000. The inspector expressed his approval of the plan as sketched out, and urged the board to push forward the scheme, so that application could be made to the Local Government Board to sanction a loan of money to carry out the works, observing that the board should not think too much of the cost, as, if such a scheme of sewerage as now shadowed forth could be carried out to completion, the value of the district would quickly increase.

PUBLIC LIGHTING AT COCKERMOUTH.—At an adjourned special meeting of the Cockermouth Local Board, held on the 6th inst., the question of the charge for public lighting was warmly discussed. The gas company had sent in a tender for £2 14s. per lamp, and at a previous meeting this offer was rejected, the local board considering that £2 5s. was a sufficient price. They, however, agreed to "split the difference," and accordingly offered £2 9s. 6d. for the street-lamps, and a lump sum of £5 per year for the savings bank clock. A letter was now read from the gas company, declining the offer of the board. In their letter, the directors said "they are fully convinced that their former offer was a fair and just one, but in consideration of a slight reduction in the price of coal since their former tender, they have decided to make a reduction of 2s. per lamp (£2 12s. per lamp). As regards the savings bank clock, the directors now decide to light it only per meter, at the rate of 5s. per 1000 cubic feet. This offer is final." The result of the discussion of the question was that the board declined to accept the amended offer, and the meeting again adjourned until this evening, when the board will consider the steps that ought to be taken to light the town during the nights of the coming winter, the clerk being instructed, in the meantime, to write to Maxwelltown and other places, where other lighting media than gas are used, and to procure patterns of certain lamps.

PROPOSED PURCHASE OF THE BURSLEM GAS-WORKS.—At the meeting of the Burslem Local Board on Wednesday last this question came under consideration, and Mr. Woodall remarked that the board were in a somewhat critical position in reference to it. It would be remembered that, by a friendly arrangement between the company and the board, the completion of the purchase had been postponed until this month. The period agreed upon would elapse very shortly, and it was just possible that the whole thing might slip out of the hands of the board. The Local Government Board had shown a very singular tardiness about this business, and when the deputation waited upon the Hon. Sclater-Booth, he perfectly conceded that if the board could contrive some scheme which should act so as to liberate the Local Government Board from the position they had taken up, there would be no particular difficulty. An ingenious arrangement had been suggested by which the board should purchase so much of the company's undertaking as came within the boundaries, and that arrangements should be made for the company to supply to Wolstanton and other places outside the boundary for the present, the board manufacturing gas, and undertaking to deliver it to the company at the boundary. He thought also that it would be well for the board—supposing there to be, as there would be, some hesitation and uncertainty about the matter—to advertise the usual notice for a special Act of Parliament to confirm the whole purchase. He suggested that the General Purposes Committee be empowered to negotiate with the gas company to carry into effect some such arrangement as he had suggested. Mr. Watkin thought they should lose no time in the matter. It became the board to show some diligence in having the matter settled as speedily as possible. Mr. Walley advocated applying for a special Act of Parliament. After some further conversation, the matter was referred to the General Purposes Committee.

PROPOSED PURCHASE OF THE LONGTON GAS-WORKS.—At the meeting of the Longton Town Council, on the 7th inst., the following resolution, adopted at the last meeting of the Gas Contract Committee, came under consideration:—"That the terms of sale of the gas-works and undertaking offered by the gas company to the corporation be accepted, and that a contract be prepared on the same terms as the last contract, so far as the variarion in circumstances will admit; and that the period of completion be on or before Feb. 28, 1879. Also, that the town-clerk be instructed to take such steps, parliamentary and otherwise, as may be necessary to carry out the proposed sale." The recommendation of the committee gave rise to a discussion as to the cost of the necessary application to Parliament and other matters. The town-clerk stated that, supposing the council took over the gas-works, it was contemplated that the whole of the profits should be applied towards the reduction of the rates of the borough. He noticed that gas consumers outside the borough paid an increased price for gas, and he thought they would have a voice in regard to having some reduction in price following upon the profits made. Mr. Jones observed that he thought the Blyth Bridge gas consumers had no right to say how the profits should be applied. The town-clerk said they had a right to represent their case before the parliamentary committee. Mr. Welch asked if it were not a fact that a contract for the purchase of the works had been signed; and the council were unable to carry out the contract, in consequence of not being able to get a loan. Mr. Welch thought it was scarcely right that the company should, under the circumstances, have made this "spring" upon the council by asking £4000 more than the sum originally arranged. The town-clerk entered into an explanation as to why the gas company stipulated the new terms. They were identical with those stated last week, to the effect that the per centage upon certain shares should be raised, which would make a difference of £2000; and £2000 would be charged as bonus, that sum, it being calculated, would accrue as profits in the interim working of the concern. As to the contract, he said it was *ultra vires*, neither party having the power to enter into such a contract as a legally binding agreement. There was no other way of getting the transfer of the works than by Act of Parliament. The Mayor said he doubted not the gas company would conduct the work to the best advantage, and there would be a considerable balance, which would fall to the lot of the council if the arrangement of purchase were carried out. He thought it would be a grand thing for the town to become possessed of the gas-works, which would most likely prove a great source of revenue. He doubted not they would be able to allow a reduction in the price of gas to the Blyth Bridge consumers, and also a reduction to consumers in the borough. After some further conversation, the recommendation of the committee was adopted, with one dissentient.

THE PRICE OF GAS.—The following information as to the price of gas in different towns, which may interest our readers, has been published as the result of information obtained by the Blackburn town-clerk in reply to questions addressed to corporations in the Northern and Midland counties. The net price is given after deducting discounts, where discounts are allowed:—

Borough.	To whom Gas-Works belong.	Small Consumers per 1000 Feet.	Large Consumers per 1000 Feet.
Blackburn	Company	4s. 3d.	4s. 0d.
Birmingham	Corporation	3 1	2 7½
Bolton	"	3 9	3 9
Burnley	"	3 0	3 0
Carlisle	"	3 0	3 0
Darlington	"	2 8	2 8
Doncaster	"	3 9	3 7
Durham	Company	4 0	3 9
Derby	"	3 2	2 10
Gloucester	"	3 10	3 10
Huddersfield	Corporation	3 7	3 7
Hanley	Company	3 6	3 6
Kidderminster	"	3 9	3 5
Lincoln	"	4 2	4 2
Leicester	"	3 0	2 10
Liverpool	"	4 3	4 3
Longton	"	3 6	3 6
Manchester	Corporation	3 6	3 5
Macclesfield	"	4 0	3 11
Northampton	Company	3 9	3 9
Nottingham	Corporation	3 2	3 0
Oldham	"	3 8	3 8
Preston	Company	3 6½	3 4
Rotherham	Corporation	3 3	3 0
Rochdale	"	4 2	3 11
Stafford	Company	3 11½	3 11½
Stockport	Corporation	4 0	3 10
Salford	"	4 0	3 11
Sheffield	Company	3 1	2 10
Southport	Corporation	3 9½	3 9½
Stockton-on-Tees	"	3 0	3 0
Sunderland	Company	3 3	3 0
Tynemouth	"	3 4	3 2
Worcester	"	3 8	3 8
Walsall	Corporation	2 5	2 1
Whitehaven	Company	3 10	3 10
Wolverhampton	"	2 9	2 9
Wakefield	"	3 0	3 0

The fault of this return is that no particulars are given as to the illuminating power of the gas supplied at the several places. Hence no satisfactory comparison can be instituted. The return, however, may stand as a record of price.

PROPOSED PURCHASE OF THE LICHFIELD GAS-WORKS.—At a meeting of the Lichfield Town Council on the 31st ult., it was stated that the Local Government Board had refused to grant the suggested interview with a deputation of the council on the subject of the gas-works purchase, and had also refused to grant permission for the council to become traders in gas until they had obtained a Provisional Order. Mr. Hodson re-opened the question of the present position of the corporation and the gas company, urging that the new agreement to purchase should be accepted by the council. He referred to two clauses to which exception was taken, explaining that they were quite in the spirit of the arrange-

ment made at the last meeting. The town-clerk pointed out that the acceptance of one of the clauses would bind the council in a dangerous manner; he also mentioned that he had received a letter from a private source, which stated most particularly that a Provisional Order would not give the corporation the power they required. The signing of the agreement meant the sum of £1466 per annum at least for the first year. Mr. Hodson read the clause in the agreement whereby the company undertake to keep the works, until the date of purchase, in as good repair as they are at present. Mr. J. Gilbert inquired as to the liability of the council for interest due on the non-completion of the purchase by June 24, 1877. It was stated that clause 9 provided that if the £18,000 and extras were not paid at that date, interest at the rate of 5 per cent. would be payable till the money was paid. It also appeared that from another clause such non-payment would nullify the contract. In reply to an inquiry, the town-clerk stated that the security to be offered by the council was the rates. After some discussion, Mr. J. Gilbert again brought forward the scheme of creating perpetual annuities, and, finding favour with the council, the discussion terminated with a resolution—"That the Gas Committee are instructed to confer with the directors of the gas company as to the substitution of perpetual annuities in lieu of cash payment of £18,000 in payment for the gas-works." The meeting then adjourned to await the result of the negotiations.

EASTBOURNE GAS COMPANY.—The half-yearly meeting was held on Monday, August 28—Dr. Jeffreys in the chair—when the following report was presented:—"A sum of £380 8s, 2d. has been expended on the capital account in laying down new mains and otherwise extending the works of the company; there is now a balance in hand on this account of £1107 2s. 2d. The revenue account for the past six months will bear favourable comparison with that of the corresponding period of last year, showing, as it does, a continued increase in the business of the company. It will be observed that after taking into account the assets and liabilities of the company, there is a balance of £1817 8s. 9d. available for dividend. The directors recommend that a dividend at the rate of 7 per cent. per annum be declared and paid upon the £5000 capital represented by B shares, and a dividend at the rate of 10 per cent. per annum on the £20,000 original capital of the company (being the maximum dividends which can be paid), leaving a balance of £642 8s. 9d. to be carried forward, or to be applied in making up deficiencies of former dividends upon the original capital, in accordance with the company's special Act of Parliament and the Acts incorporated therewith." The chairman, in moving its adoption, read a letter from the Eastbourne Ratepayers Association, asking the company to consider the question of reducing the price of gas, and citing Hastings, Brighton, Ramsgate, and other places, as examples of cheaper rates. He stated that the directors had had the matter under consideration, but that looking at the great outlay incurred in laying mains to Old Town and Meads, and the fact that these works were productive of very little revenue, and looking also at the cost of the carriage of coals, the directors did not see their way to recommending the meeting to make any reduction at present. This view seemed to be concurred in by those present, and the motion, having been seconded by Mr. Applegate, was unanimously carried. The question as to the appropriation of the balance gave rise to discussion. Some of the shareholders were in favour of the money being applied to make up past deficient dividends, it being remarked that, in years gone by, the dividend had been as low as 4 per cent. The meeting generally, however, were in favour of the formation of a reserve-fund, and it was eventually resolved to carry forward the £600 and odd accordingly. The election of the retiring directors and auditor, and a vote of thanks to the chairman, closed the meeting.

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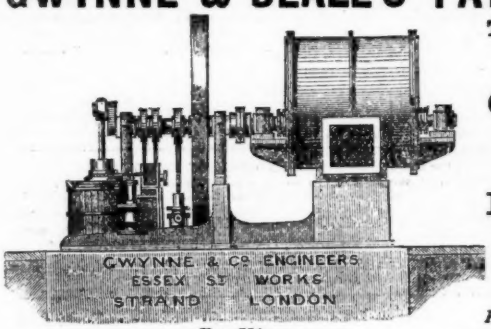

FIG. 224.

The BEST EXHAUSTERS IN THE WORLD.

GWYNNE & CO.
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Ever produced, and the most economical in working.

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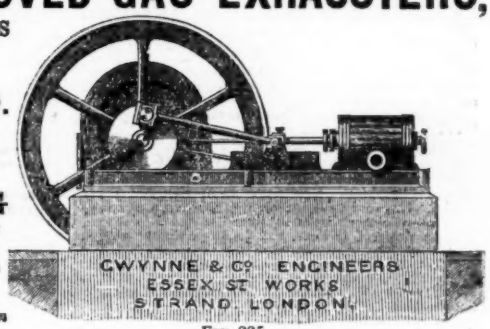
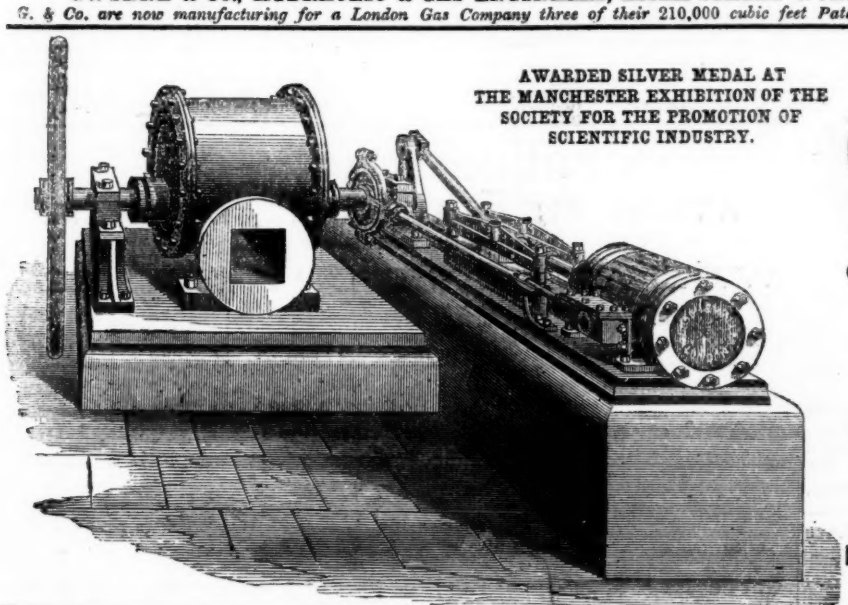


FIG. 225.

Fig. 224 represents one of those erected at the Imperial Gas-Works, Bromley, capable of passing 210,000 cubic feet of gas per hour. Several others of the same size are now on order for the same Company. These Patent Machines combine the highest quality of workmanship and materials, the largest bearings and wearing surfaces, with the most perfect system of action yet discovered. Fig. 225 represents one of a series of four at the Nottingham Gas-Works, each passing 62,500 cubic feet per hour. GWYNNE AND Co. *do not pretend to enter into a struggle with other makers in respect to cheapness. They have never sought to make price the chief consideration, but to produce Machinery of the very highest quality, and the most approved design and arrangement.* Their prices have been estimated with a due regard to the excellence of the article produced, and when this is taken into consideration, they have no fear for the result. The orders executed this season for Exhausters and alterations to their patented system amount to over 4,000,000 cubic feet of gas passed per hour, and to over 300 horse power for Engines to drive them. In every instance their work is giving the greatest satisfaction. Numerous testimonials and references can be given.

REGULATORS, BYE-PASSES, STOP-VALVES, GAS-VALVES, & MACHINERY FOR GAS MANUFACTURE, OF ALL SIZES,
CAN BE HAD ON APPLICATION TO
GWYNNE & CO., HYDRAULIC & GAS ENGINEERS, ESSEX STREET WORKS, STRAND, LONDON, W.C.
G. & Co. are now manufacturing for a London Gas Company three of their 210,000 cubic feet Patent Gas Exhausters, and many of all sizes.



AWARDED SILVER MEDAL AT THE MANCHESTER EXHIBITION OF THE SOCIETY FOR THE PROMOTION OF SCIENTIFIC INDUSTRY.

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ENGINEERS,
FOUNTAINBRIDGE WORKS, EDINBURGH,
MANUFACTURERS OF WET AND DRY GAS-METERS;
Patentees and Sole Manufacturers of PEEBLES' LAMP-GOVERNORS,
ABOVE 30,000 OF WHICH ARE NOW IN USE.
"These Lamp-Governors are so superior that they are likely to supplant all others."—*Dr. Wm. Wallace, F.R.S.E., F.C.S.*
D. BRUCE PEEBLES AND CO., FOUNTAINBRIDGE WORKS, EDINBURGH.

WANTED to purchase, by the Diss Gas Company, a good second-hand Cast-Iron TANK for Gasholder, about 41 ft. diameter and 14 ft. deep in the clear.
Apply to H. E. GARROD, Secretary, Diss, NORFOLK.

WANTED at once, by the Swindon Gas and Coke Company, a good STOKER. One who has had experience with engine and exhauster preferred. Wages 24s. per week.
Apply to J. C. ASHTON, Gas-Works, SWINDON.

WANTED, a good Draughtsman. One with a knowledge of Gas-Works preferred. Good opening for a young man.
State age, wages required, and forward copy of testimonials only, to A. E. 18, care of Messrs. Deacon's, 154, LEADENHALL STREET, E.C.

WANTED, an experienced Working MANAGER for a small Gas-Work near London, carbonizing about 250 tons of coal a year. Wages 25s. a week. A good house and garden, coals, and gas.
Address WORKING MANAGER, care of G. A. Douglas and Co., 1, Lombard Court, LONDON, E.C.

WANTED, by the Advertiser, aged 32, a situation as MANAGER, where the make of gas is from 6 to 10 millions per annum. Thoroughly practical in the manufacture and distribution of gas. Satisfactory reference as to character and ability.
Address No. 303, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by the Wellington Gas Company, Salop, a good mechanic and gas-fitter as GENERAL FOREMAN. Competent to take charge of, and assist in, the whole of the Company's work, in and out door. Must bear a good character. Wages 35s. per week, with good house, garden, coals, and gas. State age, present and previous employment.
Applications, by letter only, to the Company's Engineer, W. J. WARNER, SOUTH SHIELDS.

WANTED, by the Swindon Gas and Coke Company, a SECRETARY and MANAGER for their Gas-Works, producing about 8½ millions per annum. He must have a thorough knowledge of everything connected with the manufacture and sale of gas, laying mains and services, and the inspection of meters, &c.; be able to keep the books of the Company (by double entry), and take the minutes of the Directors meetings. Salary £100 per annum, with house, coal, and gas free. He will be required to enter upon the duties of the situation on the 1st of January, 1877.
Applications, with testimonials, and stating the age of the applicant, to be made to me on or before the 3rd of October.
J. C. ASHTON, Gas-Works, SWINDON.
Sept. 9, 1876.

AN experienced Engineer and Draughtsman desires a re-engagement as ASSISTANT GAS ENGINEER. Advertiser is thoroughly experienced in building construction, designing of gas apparatus, and gas manufacture in all its details. Excellent testimonials and references.
Address Y. E., care of Peter Scott, Esq., Maybank, Heaton Road, Withington, MANCHESTER.

WANTED.

THE Gloucester Gas Company require the services of an efficient WORKING FOREMAN.
Applications, enclosing testimonials and references, and stating wages expected, to be addressed to the undersigned. House, gas, and coals will be provided on the works.
None need apply whose character will not bear the strictest investigation as to ability and sobriety.
R. MORLAND, Manager and Engineer.
Gas-Works, Gloucester, Sept. 9, 1876.

ADVANTAGES OF GAS FOR

COOKING AND HEATING.

HINTS ON GAS BURNERS, &c.

By MAGNUS OHREN, A.I.C.E., F.C.S.

Specimen Copy by post Threepence, direct from MAGNUS OHREN, Gas-Works, Lower Sydenham, London, S.E.

GASHOLDER FOR SALE, 33 ft. diameter by 14 ft. deep, with four columns, chains, and weights. The whole in good order.
Apply to Mr. COOPER, Gas-Works, BANBURY.

ON SALE—One square Station-Meter, made by West in 1866, to register 8000 feet per hour, with 8-in. valves, bye-pass, &c., now in use and in good condition.
Apply to J. AND J. BRADDOCK, Globe Meter-Works, OLDHAM.

THE Swansea Gaslight Company have for immediate SALE, the following Plant:—
A 6-h.p. Patent Trunk Engine. (Beale.)
Cylindrical Egg-ended Boiler, 20 ft. by 4 ft. 6 in. (Beale.)
Exhauster to pass 15,000 feet per hour. (Beale.)
An 8-h.p. Grasshopper Engine. (Easton and Amos.)
Cylindrical Egg-ended Boiler, 20 ft. by 4 ft. 6 in. (Easton and Amos.)
Exhauster, 20,000 ft. per hour. (Beale.)
Tar, Liquor, and Water Pumps, Eccentrics, Shafting, and Driving Pulleys.
Wrought-iron Condenser, six vertical Legs, 30 ft. high, 24 in. by 6 in., with tar-boxes, dips, and syphons.
Wrought-iron Scrubber, 5 ft. diameter, 20 ft. high.
Cast-iron Scrubber, 3 ft. diameter, 20 ft. high.
A set of four cast-iron Purifiers, 12 ft. square by 5 ft. deep, with galvanized wrought-iron covers, lifting apparatus, four tiers of wooden sieves, 10-in. connexions and valves.
May be seen at the Gas-Works, Swansea. The whole in perfect working order; replaced by plant of larger dimensions.
Further particulars may be obtained on application to Mr. THORNTON ANDREWS, SWANSEA.

THE WEST KENT GAS COMPANY.
OFFICES, 237, SOUTHWARK BRIDGE ROAD, LONDON, Sept. 4, 1876.

The ORDINARY GENERAL MEETING of the SHAREHOLDERS of this Company will be held at the Offices, as above, on MONDAY, the 25th inst., at Three o'clock in the afternoon, precisely, for the purpose of receiving the Directors Report, and a Statement of the Company's Accounts, made up to June 30, 1876, to declare a Dividend thereon, and to sanction an increase of the Directors fees.
ROBT. P. KEYS, Secretary.

P.S.—The Transfer Books of the Company will be closed from the 11th inst. until the 25th of September.

PHŒNIX GASLIGHT AND COKE COMPANY.

NOTICE is hereby given that the ADJOURNED HALF-YEARLY GENERAL MEETING of PROPRIETORS holding, previous to the 30th of June last, £300 paid-up capital and upwards in the said Company, will be held, pursuant to the Act of Incorporation, on WEDNESDAY, the 4th of October, at Two o'clock precisely, at the Bridge House Hotel, in the Borough of Southwark, for the purpose of declaring Dividends to the 30th of June last, to determine upon an arrangement for the extension of the Company's lighting in Eltham, and on other business.
The Transfer Books will be closed on and after the 13th of September, and opened on the 5th of October.
By order of the Court of Directors,
ISAAC ADOLPHUS CROOKENDEN, Secretary.
No. 70, Bankside, London, S.E., Sept. 7, 1876.

AMMONIACAL LIQUOR.

THE Directors of the Phœnix Gaslight and Coke Company are prepared to receive TENDERS for the purchase of the AMMONIACAL LIQUOR made at their several stations. The quantities will be approximately:

From the Vauxhall Station		2,500,000	gallons per annum.	
,,	Bankside	,,	850,000	,, ,,
,,	Greenwich	,,	1,000,000	,, ,,
			4,650,000	gallons per annum.

Tenders will be received on or before Tuesday, the 10th of October next, for the quantity made at any one, or at all, of the stations, and may be for One, Two, or Three years. Parties tendering must distinctly understand that the Directors will not be bound to accept the highest or any tender.
Full particulars of the form of tender, the form of contract, the mode of estimating the ammoniacal strength of the Liquor, and other details, can be ascertained on application to the SECRETARY of the Company, at the Offices, No. 70, Bankside, Southwark, LONDON, S.E.

TO TAR DISTILLERS AND OTHERS.

THE Over Darwen Local Board of Health invite TENDERS for the purchase of the GAS TAR and AMMONIACAL LIQUOR produced at their works, for a term of Twelve months, from the 1st of October next.
Tenders, endorsed "Tar and Ammoniacal Liquor," and addressed to Mr. Coekker, the Clerk of the Local Board (where conditions of the contract may be obtained), not later than Tuesday, the 26th day of September next.
The Board do not bind themselves to accept the highest or any tender.
A. M. BRIGGS, Secretary.
Local Board Offices, Over Darwen, Sept. 7, 1876.

THE SELF-LIGHTING GAS-BURNER.
STOCKWELL'S PATENT.
Safety, Efficiency, and Economy combined.
No Matches required.
Patentee's Sole Agent for London: J. C. KNIGHT, 96, LEADENHALL STREET.

TO BE SOLD, owing to the laying down of larger ones, four 7 ft. PURIFIERS, with sieves, &c., complete. Can be seen at work till Sept. 20 next. Delivery according to arrangement.
Apply to D. W. LEES, Gas-Works, WILLENHALL.

THE Gas Committee of the Leeds Corporation are prepared to receive TENDERS for the supply of all the OXIDE OF IRON for gas purification required at their several Works during a period of Twelve months from the 30th inst. Spent material to be taken in exchange. Probable requirements about 800 tons. Samples and analyses to be addressed to Mr. Woodall, Gas-Works, Meadow Lane.
Tenders to be addressed to the Chairman of the Gas Committee, Town-Clerk's Office, Town-Hall, not later than Monday, the 18th inst., endorsed "Tender for Oxide of Iron."
The Committee do not bind themselves to accept the lowest or any tender.
By order,
C. A. CURWOOD, Town-Clerk.
Leeds, Sept. 5, 1876.

THE Gas Committee of the Leeds Corporation are prepared to receive TENDERS for the supply of several thousand new Wet Non-Compensating GAS-METERS, in iron cases, to be delivered at their Works in Leeds. Prices to include stamping fees. Also for an equal number of old ones of the same sizes, in iron and tin cases, to be taken in exchange. Every party tendering is required to send two sample 3-light meters, one of which is to be unscrewed for examination, addressed to Mr. Woodall, Gas-Works, Meadow Lane, on or before Monday, the 18th inst.
Tenders to be addressed to the Chairman of the Gas Committee, Town-Clerk's Office, Town-Hall, not later than Monday, the 18th inst., endorsed "Tender for Meters."
The Committee do not bind themselves to accept the lowest or any tender.
By order,
C. A. CURWOOD, Town-Clerk.
Leeds, Sept. 5, 1876.

NOTICE OF REMOVAL.

MR. ALFRED LASS begs to notify that in consequence of the Expiration of the Lease of No. 60, Cornhill, his Offices are now removed to
No. 30, GRACECHURCH STREET, E.C.,
and requests that in future all communications may be forwarded to him there.

GEORGETOWN (BRITISH GUIANA) GAS COMPANY, LIMITED.

NOTICE OF REMOVAL.

NOTICE is hereby Given that the Offices of the above Company are now removed from No. 60, Cornhill, to No. 30, GRACECHURCH STREET, CITY, E.C.
ALFRED LASS, Secretary.
30, Gracechurch Street, City, E.C., Sept., 1876.

BARNET DISTRICT GAS & WATER COMPANY.

NOTICE OF REMOVAL.

NOTICE is hereby Given that the Offices of the above Company are now removed from No. 60, Cornhill, to No. 30, GRACECHURCH STREET, CITY, E.C.
ALFRED LASS, Secretary.
30, Gracechurch Street, City, E.C., Sept., 1876.

GEORGE ORME & CO.,
ATLAS METER-WORKS, OLDHAM,
MANUFACTURERS OF
WET AND DRY GAS-METERS.
STATION-METERS, GOVERNORS,
PRESSURE AND EXHAUST REGISTERS,
LAMP-METERS IN CAST-IRON BOXES,
And every Description of Gas Apparatus.

JAMES MILNE & SON,
GAS ENGINEERS,
Gas-Meter, Gas Apparatus, and Gas-Fittings Manufacturers,
EDINBURGH, AND
2, KING EDWARD STREET,
NEWGATE STREET, LONDON.
Meter Works in London—2, CROSS STREET, WILDERNESS ROW, E.C.

STATION-METERS, GOVERNORS, CONSUMERS METERS, GAS LUSTRES, CHANDELIERS, BRACKETS, &c.,
And every description of Gas-Fittings and Gas Apparatus.

JOHN HALL AND CO., STOURBRIDGE,

Manufacturers of FIRE-BRICKS, LUMPS, TILES,

AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.

N.B.—A Stock of 15 and 16 in. CIRCULAR RETORTS always on hand. Other kinds made to order on short Notice.

B. DONKIN & CO.'S
IMPROVED GAS-VALVES

TRADE MARK.

WITH WROUGHT-IRON PINIONS,

List of prices, with full dimensions of all sizes up to 48-inch, to be had on application.

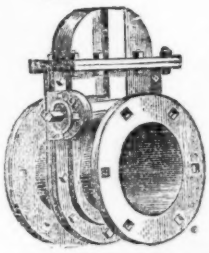
These Valves are all proved on both sides to 30 lbs. on the square inch before leaving the works, and are always kept in stock.

VALVES MADE WITH OUTSIDE RACKS TO ORDER.

ALSO, SCREW WATER-VALVES WITH GUN-METAL FACES.

ALSO SOLE MAKERS OF

J. BEALE'S NEW PATENT GAS EXHAUSTERS.



B. DONKIN & CO.,

GENERAL ENGINEERS AND IRONFOUNDERS,

MAKERS OF STEAM-ENGINES,

55a, BLUE ANCHOR ROAD, BERMONDSEY,

LONDON, S.E.

TO GAS COMPANIES AND THE TRADE.

J. DEFRIES & SONS,

MANUFACTURERS OF

CRYSTAL, BRONZED, & ORMOLU CHANDELIERS, IMPROVED CRYSTAL STAR & SUN LIGHTS, VESTIBULE LAMPS, AND THE PATENT CRYSTAL ILLUMINATION.

A LARGE STOCK ALWAYS IN HAND OF

IRON, BRASS, COMPOSITE, AND LEAD TUBES, FOR GAS AND WATER,

AND EVERY DESCRIPTION OF

GAS AND WATER FITTINGS.

THE PATENT DRY AND WET METER, WITH THE LATEST IMPROVEMENTS.

STREET LAMPS AND COLUMNS IN GREAT VARIETY.

WORKS: LONDON AND BIRMINGHAM.

GAS MOONS,
Cut and Engraved, of the newest designs

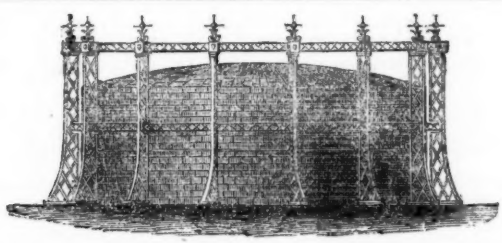
GAS REFLECTORS
In Silver and Glass

GAS NIBS
AND
BURNERS
Of every description.

Pattern-Books of Gas-Fittings, Crystal and Ormolu Chandeliers for 1876, are now complete.

City Show-Rooms and Manufactory, 147, HOUNDSDITCH, LONDON.

ESTABLISHED 1830.



THE HORSELEY COMPANY,

LIMITED,

TIPTON, STAFFORDSHIRE.

LONDON OFFICE:

6, WESTMINSTER CHAMBERS, VICTORIA STREET,

GAS ENGINEERS, IRONFOUNDERS, &c.,

MANUFACTURERS OF

GASHOLDERS, WROUGHT AND CAST IRON TANKS, CONDENSERS, PURIFIERS, SCRUBBERS, MAINS, RETORT-LIDS, PLAIN AND DISHED, LAMP-POSTS, PIPES,

AND ALL REQUISITES FOR EITHER

GAS OR WATER WORKS;

ALSO

MAKERS OF ROOFS, BRIDGES, &c.

TO BE SOLD IMMEDIATELY.

THE Barnet District Gas and Water Company have FOR SALE, by Private Contract, the GAS-WORKS, Plant, and Apparatus at Potter's Bar, Middlesex, comprising Retort-Fittings, Ascension, H, and Dip Pipes, Hydraulic Main, Vertical Condenser, Washer, two Purifiers, Station-Meter, Governor, and Gasholder, with valves and connexions complete (4-in. diameter throughout).

Also a small Cast-Iron TANK and GASHOLDER, in good working order.

For further particulars, apply to Mr. T. H. MARTIN Gas-Works, New Barnet.

By order,
ALFRED LASS, Secretary.

Offices, 30, Gracechurch Street, Sept. 9, 1876.

THE TOWN AND COUNTY OF POOLE GAS AND COKE COMPANY, LIMITED.

THE Directors of this Company, under the authority of a Resolution passed at a General Meeting of the Company, held on the 14th inst., have resolved to issue DEBENTURE STOCK for £3500, with interest at 5 per cent. per annum, payable half yearly, in January and July.

The Directors desire to call attention to the fact that, as interest on Debenture Stock takes precedence of all dividends on shares, and the dividend on the share capital of the Company (£9600) was for the last year at the rate of 10 per cent. per annum, the security is unquestionable.

Applications, addressed to the Secretary, will be received at the Company's Office, Poole, for any portion of the said Stock, not less than £50 or any multiple of £50, up to, and including, the 25th of September next.

JOHN BUDDEN, Secretary.

Gas-Works, Poole, Aug. 24, 1876.

BAILEY'S Patented Inventions are now in extensive use wherever steam is known. Bailey's Patent Steam Gauges, Pyrometers, Water Gauge Cocks, Test Pumps, Fusible Plugs, Steam and Water Valves, Safety Valves, Junction Valves, Pumps, Tell-Tales, Recorders, Lightning Conductors, Electric Telegraphs, Turret Clocks, Steam Joint Cement, Lifting Jacks, Boiler Feeders, Lime Catcher and Separator, Injectors and Ejectors, and every description of first-class Brass Work for Engines and Boilers. Gas-Works Managers who have not our large book should send for it.

16th edition, 1000 engravings, 4to., post free 2s. in stamps, weight 10 oz., cost of production £1000,

BAILEY'S Illustrated Inventions, containing details and prices of goods in our five several departments:—(1) Brass Foundry, Steam Gauges, Indicators, Feeders, and Fittings; (2) Engineers Sundries, Small Tools, and Stores; (3) Machine Pump and Fire Engine; (4) Turret Clock, &c.; (5) Electric Telegraph, A B C Instruments, Bells, and Apparatus.

J. BAILEY and Co., Albion Works, Salford, LANCASHIRE.

T. NEWBIGGING,

CONSULTING GAS ENGINEER,

5, NORFOLK STREET, MANCHESTER.

HENRY LYON,

ENGINEER,

AND

CONSULTING GAS ENGINEER,

BROOKLYN, CHEETHAM HILL ROAD,

MANCHESTER.

Mr. ALFRED LASS,

30, GRACECHURCH STREET, LONDON, E.C.,

Is prepared to open the Books, and, if necessary, keep the Accounts of Gas and Water Companies.

To examine the Books and Accounts, and prepare Balance-Sheets for the information of Directors.

To assist Secretaries in preparing Balance-Sheets, according to the "Gas-Works Clauses Act, 1871;" or may be consulted with respect to Accounts generally.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.

Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.

Patents procured for Foreign Countries.

Information as to cost, &c., supplied gratuitously upon application to the Advertiser, 22, Great George Street, WESTMINSTER.

GAS COMPANIES
AND
LOCAL BOARDS
Requiring New Street-Lamps are recommended

A **KEEN'S PATENT**
DOUBLE-CLIP
STREET-LAMP.

A great improvement on the old-fashioned 14-in. Lamps.

They have been sold to various Gas-Works throughout the country and abroad, and the highest satisfactory testimonials are given as to their superiority.

For particulars of price, &c., apply to

WILLIAM KEEN, Sole Proprietor and Manufacturer, Robertson Street, HASTINGS.

CATHELS'S Patent District Dry Gas-GOVERNOR is the only perfect self-acting contrivance for Regulating the Pressures in the higher levels of a district.

For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, ROTHERHAM.

CATHELS & TERRACE'S Patent Four-WAY DISC GAS-VALVE is the simplest and best Valve for Purifiers, and as a By-pass for other apparatus in Gas-Works. It is always gas-tight, and has no springs, ground faces, or other delicate parts. By its use the flow of the gas cannot be accidentally stopped, and it never sticks.

For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, Foundry and Brass Works, ROTHERHAM.

PATENT FUEL AND LIME FOR PURIFYING FROM FOUL LIME.

By a simple process the Foul Lime is converted into Fuel, by the combustion of which the lime is reproduced as a purifying agent.

Licences to work the invention will be granted to Gas Companies on very reasonable terms.

For further particulars apply to Mr. E. MADDOCKS, Manager of the Gas-Works, KETTERING.

The adoption of the above invention, without a licence from the Patentee, will be an infringement of the patent, and will subject the person or company guilty of such infringement to legal process.

LAMP-PILLARS,

GAS-LAMPS, FOUNTAINS.

Our New and Choice Designs for the above, with prices, are forwarded to any part of the world on receipt of twelve stamps. Estimates for work at home or abroad.

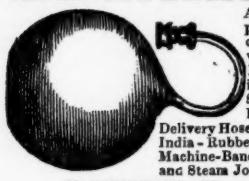
W. T. ALLEN & CO.,

GAS & WATER ENGINEERS & CONTRACTORS,

203, UPPER THAMES STREET,

LONDON, E.C.

CLOTH GAS-BAGS FOR MAINS,

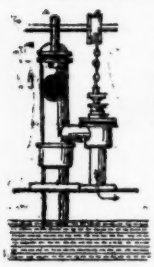


As supplied to the Imperial, Chartered, and other London and Provincial Gas Companies. Bellows and Valves for inflating Well Dresses, Stokers Gloves, India-Rubber Suction and Delivery Hose, Gas-Tubing, Leather India-Rubber and Gutta-Percha Machine-Bands, Sheet and Washers and Steam Joints.

T. BUGDEN, Manufacturer,

79, GOSWELL ROAD, LONDON, E.C.

COPP'S PATENT ANTI-DIP GAS APPARATUS.



Produces from 10 to 20 per cent. more gas of higher illuminating power.

Prevents the deposit of carbon.

Retorts last much longer.

Charges work off quicker.

This simple invention has been in use in many works for the last six months, with the above results.

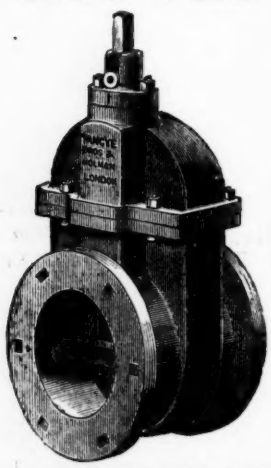
PRICE 2 GUINEAS EACH.

Testimonials and particulars on application.

Address **WALTER L. COPP,** WATCHET, SOMERSET.

IMPROVED

GAS-VALVES.



SIZES AND REDUCED PRICES ON APPLICATION.

TANGYE BROS. & HOLMAN,

LAURENCE POUNTNEY LANE,

LONDON.

ALFRED WILLIAMS,

PHŒNIX FIRE-BRICK WHARF,

64, BANKSIDE, SOUTHWARK, LONDON, S.E.

GAS ENGINEER AND CONTRACTOR FOR THE ERECTION OF GAS-WORKS, AND FOR THE

SUPPLY OF RETORTS, FIRE-BRICKS, CAST-IRON MAINS,

AND ALL MATERIALS FOR GAS MANUFACTURE AND DISTRIBUTION.

GEORGE NEWTON,

UNION STREET WEST, OLDHAM.

MANUFACTURER OF

SQUARE STATION-METERS, with PLANED JOINTS;

ROUND STATION-METERS, WITH CAST-IRON STANDS;

WET AND DRY CONSUMERS GAS-METERS, GOVERNORS, &c.

SAM. CUTLER & SONS,

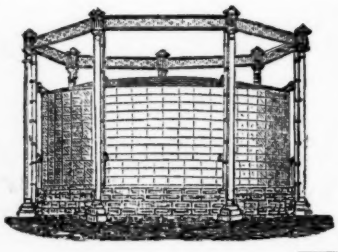
CONTRACTING GAS ENGINEERS,

GASHOLDER & GENERAL GAS APPARATUS MAKERS,

MANUFACTURERS OF

BOILERS, IRON ROOFING, IRON BRIDGES,

AND GENERAL IRONWORK.



S. C. AND SONS undertake Contracts of any magnitude for the **Erection of new and Remodelling of existing Gas-Works,** for **Gasholders, Cast and Wrought Iron Tanks, Iron Roofs,** and every description of **Apparatus** for the Manufacture and Distribution of Gas.

Special attention is invited to their **"Improved Condenser,"** which is very effective, and much approved; also to their patterns of **Annular** and other **Condensers, Scrubbers,** and **Purifiers,** of all sizes, which they arrange either with **Centre** or Ordinary **Slide Valves.**

WORKS FOR THE SUPPLY OF

VILLAGES, MANSIONS. FACTORIES, &c.

S. C. AND SONS undertake the **Supply** and **Laying** of **Mains** for **Gas and Water,** and supply all Castings, Connexions, and Fittings for Retort-House, Works generally, and for Streets. They also supply **Valves** of all descriptions, Iron and Clay Retorts, Hotpressed Retort-Lids, Steel Charging-Scoops of improved make, for which they have special machinery, Improved Coke and Coal Barrows, Cross-Bars and Screws, Bolts and Nuts, Furnace and Stoking Tools, Iron and Wood Purifier-Sieves, Lead, Yarn, Borings, &c., including every requisite whatsoever for a Gas-Work, a well-assorted stock being kept of those goods most in request.

SOLE MAKERS OF BRETT'S PATENT COKE BARROW.

Experienced Retort Setters sent to any part of the Kingdom.

Address: PROVIDENCE IRON-WORKS, MILLWALL, LONDON.

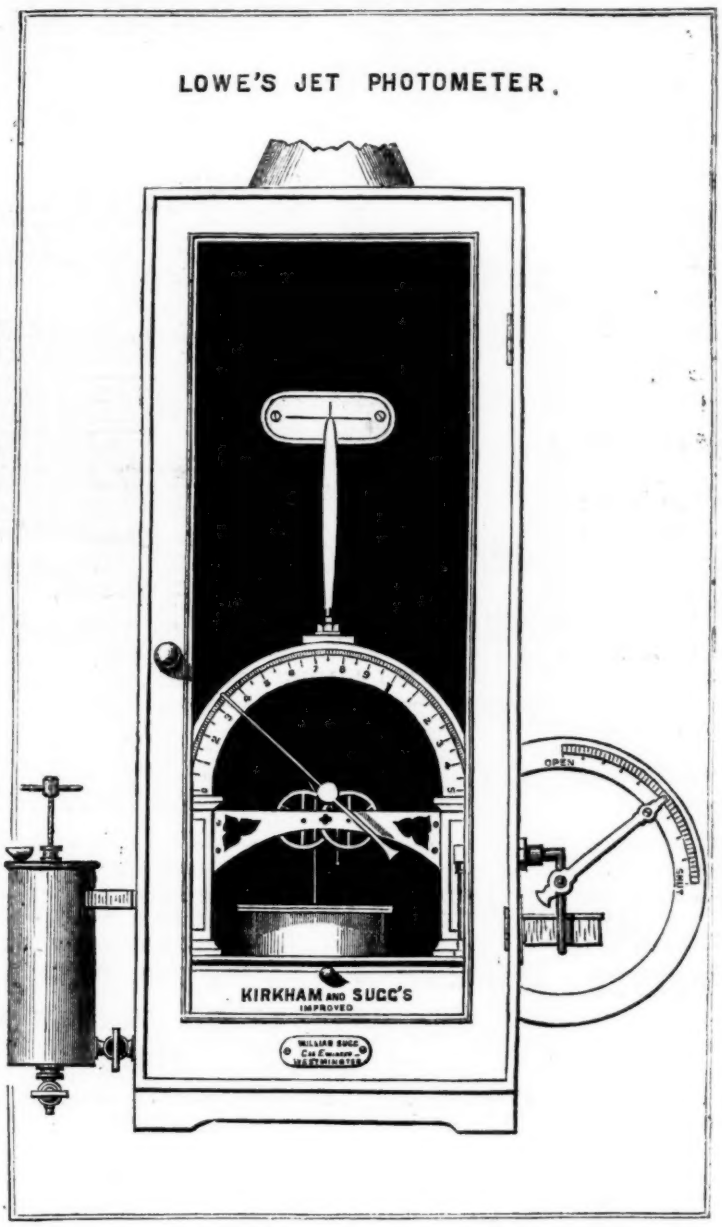
WILLIAM SUGG,

GAS ENGINEER,

VINCENT WORKS, VINCENT STREET,

WESTMINSTER, S.W.

"EVANS" Photometers, which do not require a Dark Room, with every Fitting accurately made to Gauge, French Polished Bench and Drawers complete, as approved by the Gas Referees.



"LETHEBY" Photometers, with Fittings and Bench complete for Dark Room, as approved by the Gas Referees.

LOWE'S JET PHOTOMETER

(KIRKHAM AND SUGG'S IMPROVEMENTS),

With new external Water-Line Regulator; Improved Micrometer, with Quadrant divided into 45 degrees; Valve, with *pro ratâ* opening; Improved Ventilator, Purple Glass Height of Flame Measurer; King's Gauge, working on Friction Rollers. In French Polished Pine Case. Diagram for ditto for finding the Illuminating Power in Candles.

PRICE £12 10s. COMPLETE.

Can also be had with additional Scale on Pressure Gauge, to show by inspection the Illuminating Power in Sperm Candles, at a slight extra cost.

NOTE.—When an order is given for a Jet Photometer with this latter addition, it will be necessary to state about the quality of Gas for which it will be used. The range in candles will not be more than three or four.

PRICE LISTS WILL BE FORWARDED POST FREE ON APPLICATION.

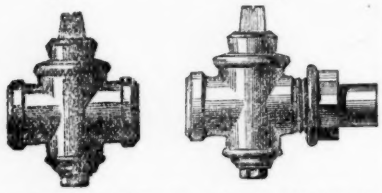
INTERNATIONAL EXHIBITION, 1862.
CLASS X.
PRIZE MEDAL
For excellence of Fire-Clay Gas Retorts, and
"HONOURABLE MENTION" for
good quality of Fire-Bricks.

WILLIAM STEPHENSON & SONS,
THROCKLEY,
NEWCASTLE-ON-TYNE.

LAMBERT'S
CAST-IRON GAS-MAIN COCKS,
WITH PATENT WHITE METAL PLUGS.

TRADE (L) MARK.

No. 758. No. 759.



The bodies of these Taps are made of iron, black or galvanized, and the plugs of patent metal. They are warranted not to set fast or corrode, as do Iron or Brass Cocks; will always work easily; are strong, well made, durable; of little or no intrinsic value, and therefore not likely to be stolen; and the prices as stated below are (especially upon the larger sizes) fully 50 per cent. less than Brass Cocks.

	½	¾	1	1¼	1½	2-inch.
No. 758, with inside screws for iron pipe, black	2/0	3/0	4/4	6/6	7/6	12/0 each.
No. 759, with union on one end screwed inside for iron pipe, black	2/9	3/10	5/4	8/0	9/0	15/6 each.
Nos. 758 and 759, galvanized	0/3	0/4	0/6	0/8	0/10	1/4 extra.

MANUFACTORY:
SHORT STREET, LAMBETH, LONDON.

TORBAY AND DART PAINT COMPANY, LIMITED.

WORKS:
DARTMOUTH AND BRIXHAM, DEVON.

OFFICES:
23, GREAT GEORGE STREET, WESTMINSTER, LONDON, S.W.

SOLE PROPRIETORS AND MANUFACTURERS OF
WOLSTON'S CELEBRATED
TORBAY IRON PAINTS.
(ESTABLISHED 1851.)

TRADE MARK

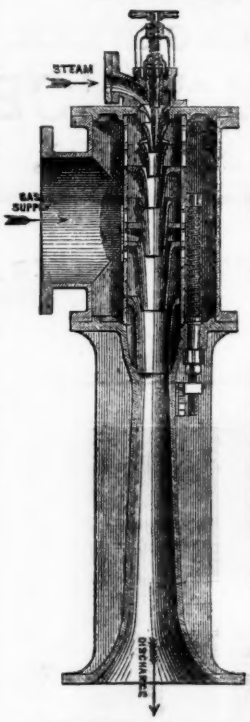
These Paints have been for many years extensively used in Her Majesty's Royal Dockyards, Woolwich Arsenal, the Shorncliffe and Curragh Camps, War Departments, and Colonies, and are largely supplied to Railway, Harbour, and GAS COMPANIES, Shipowners, Engineering Establishments, Railway Carriage and Waggon Works, and the Paint Trade generally. They are the BEST PROTECTORS OF IRONWORK, even arresting corrosion after it has set in; and their base being oxide of iron, they are free from those properties which make lead paints so destructive to ironwork. They do not scale or blister, are not affected by great heat, and are the only Paints which will resist the effects of sulphuretted hydrogen. Their DURABILITY and covering properties have borne the test of A QUARTER OF A CENTURY'S PRACTICAL TRIAL.

The undermentioned colours—ground in best linseed oil, and requiring only before use to be thinned down in the ordinary way—are kept in stock:—

Torbay Brown.	Torbay Red.
Dart Green.	Slate.
Dart Yellow.	Buff.
Brixham Black.	Torbay Chocolate.
Light Blue.	Cream Colour.
Dart Brown.	Dart Umber.
Imperial Stone.	Light Stone.
Bronze Green.	Salmon Colour.
Navy Green.	Lead.
Carriage Red.	Dark Stone.
Light Lead.	Crystal Palace Blue.
Light Green.	Iron Grey.

All other Colours made to order.
PRICES and TESTIMONIALS on APPLICATION.

KÖRTING BROS.,
Steam-Jet Engineers,
7 and 17, LANCASTER AVENUE,
MANCHESTER.
Germany: Cellerstr. 35, Hannover. Austria: Kolring., Pestalozzigasse 6, Vienna.
France: 11, Rue Louis-le-Grand, Paris. U. S.: 1645, N. 10th St., Philadelphia.



E. KÖRTING'S PATENT
STEAM-JET GAS-EXHAUSTER.
IMPROVED CLELAND'S PATENT.
Small Cost—Compactness—Perfectly Self-Acting—
Self-Regulating—Self-Cleansing—No Steam-Engine—No Attention—
No Extra Room Required—No Wear and Tear—No Noise—
No Oscillation in Vacuum, or Back Pressure.
UPWARDS OF 200 IN USE.
SUPPLIED TO—

Chartered Gas Co.	Glasgow Corporation.	Hanna, Donald, and Wilson, London.
London Gas Co.	Leyland Gas Co.	Ratcliff Gas-Works.
S. Metropolitan Gas Co.	Stalybridge Gas-Works.	Kendal Gas-Works.
Phœnix Gas Co.	Lincoln Gas-Works.	Longton Gas Co.
Liverpool Gas Co.	Birmingham Gas-Works.	Dartford Gas Co.
Bolton Corporation.	Wakefield Gas-Works.	Exeter Gas Co.
Horsham Gas Co.	Brentford Gas-Works.	Harrogate Gas Co.
Epsom and Ewell Gas Co.	Burnley Gas-Works.	Hertford Gas Co.
Ipswich Gas Co.	Guildford Gas-Works.	Waterside Gas-Works, Todmorden.
Cheltenham Gas Co.	Gloucester Gas-Works.	F. W. Grafton and Co., Accrington.
Sandwich Gas Co.	Kirkintilloch Gas-Wks.	
Cornholme Dis. Gas-Wks.	Nantwich Gas-Works.	
Bury Gas-Works.	Enniskillen Gas-Works.	

&c., &c., &c.

E. KÖRTING'S PATENT STEAM-JET REVIVIFYING BLOWERS FOR THE PURIFYING MATERIAL.

SOLE LICENSEES FOR
W. CLELAND'S PATENT STEAM SCRUBBER,
Combining small cost and thorough efficiency, with absence of any mechanical means and necessity of renewing the scrubbing material.

FOR PARTICULARS, APPLY TO
KÖRTING BROS., 7 and 17, Lancaster Avenue,
MANCHESTER,
OR TO
GERALD J. TUPP, 8, John Street, Adelphi, W.C.,
LONDON,
SOLE AGENT FOR ENGLAND AND WALES.

S. OWENS & CO.,
WHITEFRIARS STREET, LONDON, E.C.,
HYDRAULIC ENGINEERS,
AND MANUFACTURERS OF
PUMPING MACHINERY of every Description.
SOLE LICENSEES AND MANUFACTURERS FOR GREAT BRITAIN OF
BLAKE'S PATENT STEAM-PUMPS,
More than 8000 in use,
ESPECIALLY ADAPTED FOR USE IN GAS AND CHEMICAL WORKS, FOR PUMPING TAR, WATER, AMMONIACAL LIQUOR, ACIDS, &c.
The following are some of the prominent advantages of the BLAKE PUMP:—

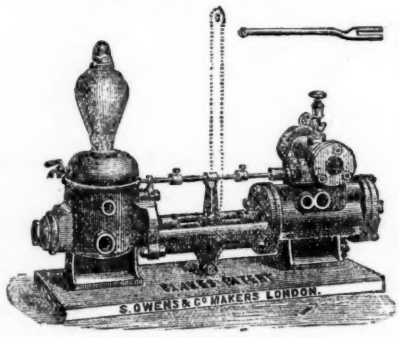
It will start at any point of stroke.

It has no dead point.

It works fast or slow, with the same certainty of action.

It is economical. Has a lead on the slide-valve.

It is compact and durable.



It is interchangeable in all its working parts.

It will deliver more water than any other pump.

It is made of best materials in the most workmanlike manner.

Can be worked at 20 strokes per hour, or 200 strokes per minute.

This Illustration represents Boiler-Feed Pumps, Sizes Nos. 1, 2, and 3, with Hand Lever for working Pump when Steam is not available.

SOLE MANUFACTURERS OF
MANN & OWENS
IMPROVED PATENT GAS-VALVES.

PRICED LISTS AND FULL PARTICULARS FURNISHED ON APPLICATION.

LIVESEY FIRE-CLAY WORKS.

NEAR BLACKBURN, LANCASHIRE.

(ESTABLISHED 1835.)

ORLANDO BROTHERS, LIMITED,

MANUFACTURERS OF PATENT CLAY RETORTS,

AND EVERY DESCRIPTION OF

TUBULAR GLAZED SEWERAGE PIPES, BENDS, JUNCTIONS, ETC.

FIRE-BRICKS, TILES, BLOCKS, AND CHIMNEY-TOPS

THE FARNLEY IRON COMPANY, LIMITED,

FARNLEY, near LEEDS,

MANUFACTURERS OF

FIRE-CLAY GAS-RETORTS & FIRE-BRICKS,

Of every size and shape, and of the best quality; also of White and Coloured GLAZED BRICKS, SANITARY PIPES, &c., &c.

In order to meet the constantly increasing demand for their Gas-Retorts, the F. I. Co. have recently made such an addition to their premises as will enable them to execute expeditiously the largest home or foreign orders.

London Agent for Gas-Retorts: D. W. OGG, 3, Jeffrey's Square, St. Mary's Axe, E.C.

" " Glazed Bricks: A. BARFIELD, 22, Great George Street, Westminster.

SIZE STRENGTHS &c OF ROLLED JOISTS.

A	B	C	D	E	A	B	C	D	E
41	19¾	7"	102	81[illegible]					
1	16"	5½	57½	44					
31	15"	5"	50½	3[illegible]	19	6¾	2	10¾	30
3	14"	5½	60	325	20	5½	2"	10&12	22½
4	12"	6"	56	300	35	5½	7¾	12½	30
5	12"	5½	42	220	23	5"	4½	23	35
30	10"	5"	36	175½	22	5"	3"	13	30
6	10"	4½	32	130	36	4¾	2"	8	17½
32	9½	4½	23	116	40	4"	3"	11	20
9	9¼	3½	24 & 30	90	25	4"	2"	8½	14
33	8¾	2¾	18	60	37	3"	2"	5½	10
12	8"	4"	22	80	38	3"	3"	9	17½
11	8"	5"	29	85	A	No ON SECTION SHEET			
13	8"	2½	15	40	B	DEPTH IN INCHES			
39	7"	4"	22½	70	C	WIDTH OF FLANGE			
15	7"	3½	19	60	D	USUAL WEIGHT PER FT			
16	7"	2¼	14	35	E	CONSTANT.			

TO FIND SAFE DISTRIBUTED LOAD IN TONS DIVIDE THE CONSTANT BY THE SPAN IN FEET.

ROLLED JOISTS & FLITCHES.

CHAS WILLIAMS, & Co.

RIVETED GIRDERS

FLITCHED BEAM

90 CANNON STREET LONDON. E.C.

MANUFACTURERS OF CAST & WROUGHT IRONWORK OF EVERY DESCRIPTION.

RIVETED & ROLLED GIRDERS. ROOFS. SCRUBBERS. CONDENSERS. GAS HOLDERS. TANKS &c.

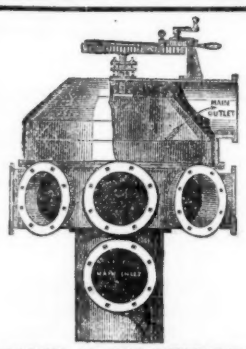
STANCHEONS T A N K S COLUMNS

AGENTS { BIRMINGHAM. Messrs E.C. & J. KEAY. 90, NEW STREET
GLASGOW Messrs BLACKLEY, YOUNG & Co 163, ST VINCENT STREET.
LIVERPOOL M&W. E. HALLAM, ALBION BUILDINGS, CANNING PLACE

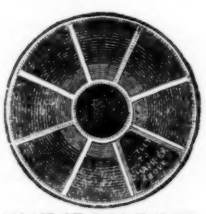
SECTION SHEET, AND PARTICULARS ON APPLICATION TO THE ABOVE.

C. & W. WALKERS'

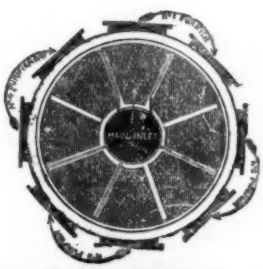
PATENT CENTRE-VALVES.



ELEVATION OF THE CENTRE-VALVE.



PLAN OF THE VALVE.

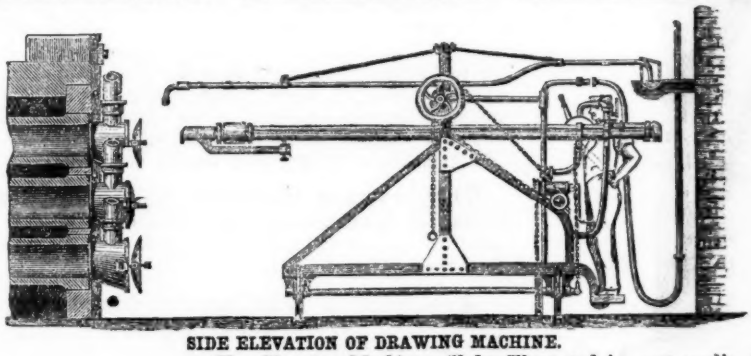


PLAN OF THE BODY.

These PATENT CENTRE-VALVES are the most perfect and certain means for working Purifiers on the system of three in action, and one out of action. The Valve itself is protected from all injury inside the safety cover. The working of the Valve is so easy, and so governed by the stop-catch movement, that the Purifiers can be instantaneously changed in the dark as well as in daylight. They are scraped perfectly true, metal to metal, the facings heretofore exposed are always covered, and there is nothing more reliable, certain, and durable in a gas-works. By their use the floor of the Purifying-house is clear and level; the Valve and all connexions being beneath the floor, out of the way of working. A considerable improvement and saving is effected in the cost of the connecting-pipes.

MIDLAND IRON-WORKS. DONNINGTON, near NEWPORT, SHROPSHIRE; 8, FINSBURY CIRCUS, LONDON.

FOULIS'S PATENT STOKING MACHINE.

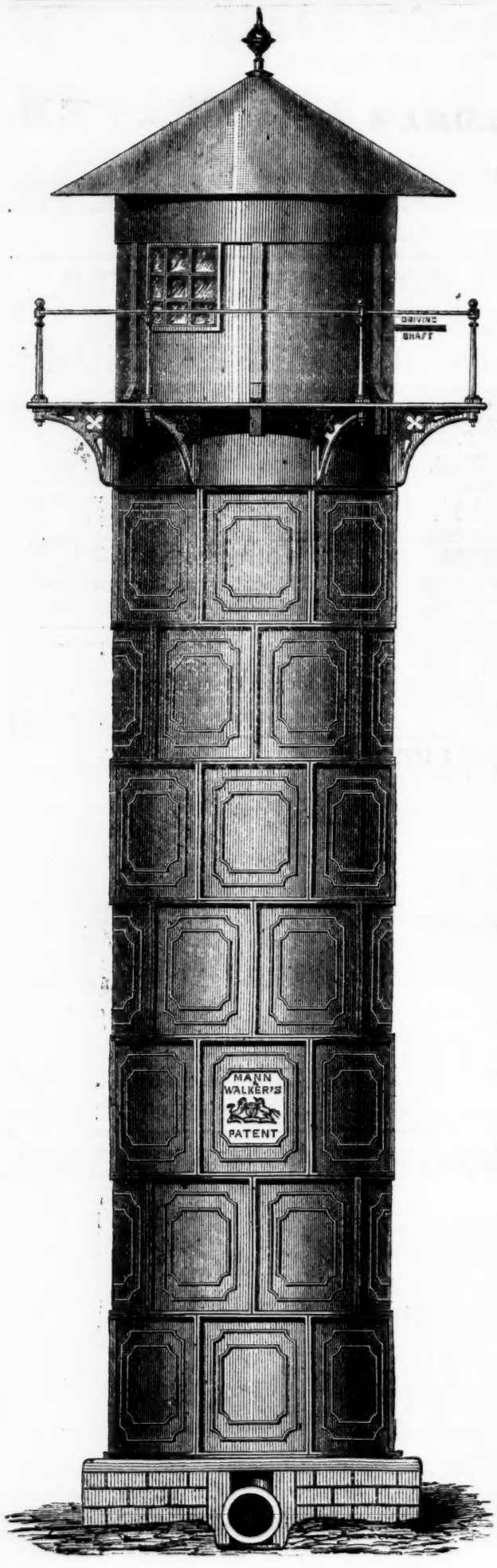


SIDE ELEVATION OF DRAWING MACHINE.

END ELEVATION.

(The Charging Machine will be Illustrated in next week's Advertisement.)

Makers: TANGYE BROTHERS and HOLMAN, London and Birmingham; ADAM WOODWARD and SON, Manchester; ROBERT LAIDLAW and SON, Glasgow; MASCHINENBAU-ACTIEN-GESELLSCHAFT HUMBOLDT, Kalk bei Deutz:
Or all particulars may be had from JAMES WOTHERSPOON, 31, St. Vincent Place, Glasgow.



C. & W. WALKER,
8, FINSBURY CIRCUS,
LONDON, E.C.

MANN & WALKERS' PATENT SCRUBBER.

By Letters Patent in Great Britain, Europe, and the United States of America.

By some important improvements recently patented, the purifying power of these Scrubbers has been much increased, and a stronger ammoniacal solution obtained, which is found to absorb a large portion of the carbonic acid contained in gas, effecting an important saving in money and labour in the lime purifiers, and where oxide only is used, the increase in the illuminating power of the gas obtained by these Scrubbers is shown in a remarkable degree, in consequence of the large quantity of carbonic acid removed from the gas.

It is to be particularly noted that the im-portant results of these Scrubbers do not depend upon the machinery alone. The entire internal construction of the Scrubber bears an almost equally important part. For this reason, where it is desirable to convert existing Scrubbers, whose dimensions happen to be suitable, the work commences by ripping out the whole of the interior of the shell, and beginning the internal construction *de novo* from bottom to top.

They are, in all cases, constructed under guarantees to perfectly perform their work. They are now extensively used in the largest gas-works of London and the chief cities of Europe, the number in use exceeds **one hundred,** and their perfect efficiency and profit to a gas company have been fully established with every variety of coal used in Europe. References can be given to the largest gas-works in Europe.

By their use the department of purification from ammonia upon a gas-works is made complete, without the aid of prepared oxide of iron, chemicals in purifiers, or any other supplementary process, and the whole ammoniacal residual product contained in the coal is absorbed and obtained in the form most profitable to a gas company, while the requirements of all Acts of Parliament and of the Board of Trade, relating to incorporate gas companies, are satisfied.

Foul Gas, properly condensed, entering the inlet is, by once only passing through the Scrubber, completely purified from ammonia with regular certainty day by day, without any further trouble, or any other process, effected by a very small quantity of clear water let into the machinery room at the top of the Scrubber, which is discharged at the liquor outlet at the bottom, from Newcastle coal at about 18 to 20 ounces strength, from Yorkshire and other coals, generally from 25 to 30 ounces strength; while acidulated litmus or turmeric exposed at the Scrubber outlet will not show the slightest discoloration, and there is not a quarter of a grain of ammonia per 100 feet left unabsorbed.

They contain their own engine power, re-quiring only a small inappreciable quantity of steam from the gas-works boiler, and are then complete in themselves, ready for service.

Applications relating to dimensions and prices should be addressed to us, C. AND W. WALKER, 8, FINSBURY CIRCUS, LONDON, E.C., or to Mr. WILLIAM MANN, late Superintendent of the Chartered Gas-Works, BLACKFRIARS, LONDON; they should state approximately the largest make of gas in 24 hours on a winter's day, and the smallest make on a summer's day, to be purified.

J. & J. BRADDOCK,

GAS ENGINEERS,

GLOBE METER-WORKS, OLDHAM,

MANUFACTURERS OF

WET & DRY CONSUMERS GAS-METERS,

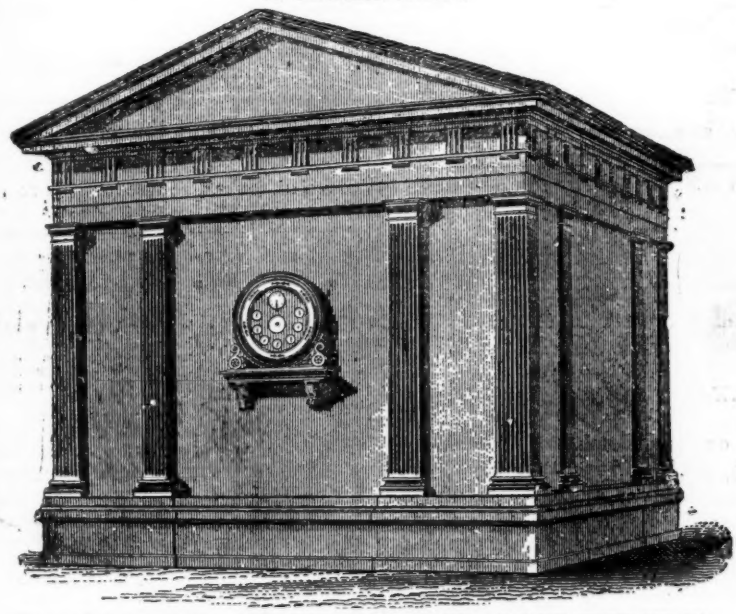
OF THE HIGHEST EXCELLENCE ONLY;

ALSO LICENSEES AND MANUFACTURERS OF

WARNER & COWAN'S PATENT SELF-REGULATING GAS-METERS;

ROUND STATION-METERS,

ON CAST-IRON STANDS.



SQUARE STATION-METERS,

WITH PLANED JOINTS.

GOVERNORS, GAUGES, INDICATORS, MAIN COCKS, &c.

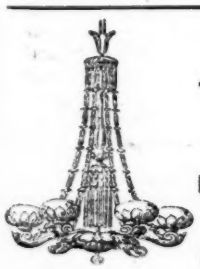
GAS COOKING APPARATUS.

Home and Foreign Orders promptly attended to.

All Sizes of CONSUMERS METERS, STATION-METERS, and GOVERNORS generally in Stock.

Orders almost invariably despatched on the day of receipt.

TERMS, &c., ON APPLICATION.



F. & C. OSLER,

45, OXFORD STREET, LONDON, W.

MANUFACTORY AND SHOW-ROOMS:

BROAD STREET, BIRMINGHAM.

ESTABLISHED 1807.

MANUFACTURERS OF CRYSTAL GLASS CHANDELIERS,

WALL LIGHTS, AND LUSTRES FOR GAS AND CANDLES.

TABLE GLASS OF ALL KINDS.

CHANDELIERS IN BRONZE AND ORMOLU. MODERATOR LAMPS.

GEORGE ANDERSON,

GAS AND CONSULTING ENGINEER,

35A, GREAT GEORGE STREET,

WESTMINSTER, S.W.

PATENTEE and MANUFACTURER of the following Inventions:—

RETORT SETTINGS—giving great Economy of Fuel.

STEAM-ENGINES and EXHAUSTERS, FOUR-WAY VALVES.

FUEL-MACHINE, for Compressing Breeze and Tar.

WASHERS, SCRUBBERS, and PURIFIERS, that Economize Space and Cost.

N.B.—Pamphlet, with Eighteen Illustrations of the foregoing, with letterpress on the construction of Gas-Works, post free, 2s. 6d.

SCOTTISH CANNEL COAL SUPPLY

AND

GAS ENGINEERING ESTABLISHMENT,

EDINBURGH.

In consequence of Mr. WILLIAM ROMANS having accepted the appointment of Engineer-in-Chief to the Sheffield Gas Company, the firm of J. and W. Romans, Gas Engineers and Coal Factors, is dissolved, and Mr. John Romans, C.E., F.G.S.E., is again Sole Proprietor.

Mr. Romans, in resuming the direction of this old-established business, desires to embrace the opportunity of inviting the attention of Corporations and Gas Companies to the great importance of a skilful selection of the Cannel and Coal to be carbonized. It is a fact known to those who have patiently manipulated the distillation of gas from Cannel and other Coals, with a view to obtain the highest economic results, that by a judicious intermixture of the lighter with the heavier gases, much of the rich hydrocarbons are saved, which otherwise would be lost during the process of manufacture.

It is with the experience of over 30 years continuous observation to this essential branch of science that Mr. Romans ventures to place at the disposal of his friends, Corporations, and Gas Companies at home and abroad, the practical knowledge he has thus acquired in the basis of gas manufacture and its residual products. Also upon all matters appertaining to the mechanical department of Gas-Works, he is, as a bred engineer, prepared to advise or contract for the supply or repair of the apparatus, or overlook and attest its construction for exportation.

OFFICES:

30, ST. ANDREW SQUARE, EDINBURGH.

N.B.—Mr. Romans has no INTEREST in, nor is he AGENT for, any special Colliery.

TROTTER, HAINES, & CORBETT,

BRETTELL'S ESTATE

FIRE CLAY & BRICK WORKS,

STOURBRIDGE.

Manufacturers of GAS-RETORTS, GLASS-HOUSE FURNACE & BLAST-FURNACE BRICKS LUMPS, TILES, and every description of FIRE-BRICK.

Proprietors of

BEST GLASS-HOUSE POT and CRUCIBLE CLAYS.

Successors to

E. BAKER AND CO., LATE BRIERLEY HILL, STAFFORDSHIRE.

MOBBERLEY & PERRY,

FIRE CLAY and BRICK WORKS

STOURBRIDGE.

Proprietors of

BEST GLASS-HOUSE POT and CRUCIBLE CLAY.

Manufacturers for Home and Export.

GAS-RETORTS, GLASS-HOUSE FURNACE,

BLAST-FURNACE, TANK BRICKS, LUMPS, TILES,

And Every Description of Best Fire-Bricks.

B. CARPENTER,

(ESTABLISHED MORE THAN 15 YEARS,)

THE ORIGINAL MANUFACTURER OF

WOOD SIEVES

FOR

GAS PURIFIERS & SCRUBBERS.

WORKS:

22, HERMES STREET, PENTONVILLE ROAD,

LONDON, N.

DEMPSTER'S

RENOWNED

WOOD SIEVES,

WITH TAPER BARS,

MADE BY MACHINERY

CAPABLE OF MAKING 10,000 PER WEEK.

References to Hundreds of First-Class Engineers.

ROSE MOUNT IRON-WORKS

ELLAND, NEAR HALIFAX.

GAS AND WATER PIPES.

WILLIAM MACLEOD & CO.,

18 & 20, ALSTON STREET, GLASGOW.

CAST-IRON GAS AND WATER PIPES.

DELIVERY F.O.B. ON CLYDE, OR STOCKTON-ON-TEES.

Prices on application.

ROBERT MARSHALL,
CANNEL COAL MERCHANT,
173, ST. VINCENT STREET, GLASGOW.

SHOTT'S BOGHEAD.

LOTHIAN'S CANNEL
Yields 12,500 cubic feet of 34-candle gas per ton, and 9 cwts. of excellent coke, containing only 4 per cent. of ash.

MUIRKIRK, No. 1, CANNEL
Yields 12,160 cubic feet of 32·5-candle gas per ton, and 10 cwts. of excellent coke, containing only 5 per cent. of ash.

OLD WEMYSS CANNEL
Yields 13,320 cubic feet of 32·5-candle gas per ton.
Prices and full Analyses on application.

CANNEL COAL.
COPPA COLLIERY, MOLD,
Beg leave to call the attention of Gas Companies to the superior quality of their
CANNEL FOR GAS-MAKING PURPOSES.
This Cannel produces in actual working, in iron retorts, 9200 cubic feet of 32-candle gas, and upwards of 11 cwt. of coke, and in clay retorts will produce 11,500 cubic feet of 25·9-candle gas.
Ports of shipment—Birkenhead or Connah's Quay.
Waggons supplied for delivery by railway to any part of England or Wales.
For particulars, prices, and rates of freight, apply to The Coppa Colliery, Mold, FLINTSHIRE.

JAMES OAKES & CO.,
ALFRETON IRON-WORKS, DERBYSHIRE,
AND
WENLOCK IRON WHARF, 21 & 22, WHARF ROAD, CITY ROAD, LONDON, N.,
Keep in London and at their works large stocks of PIPES and CONNEXIONS (1½ to 36 inches in diameter); also make and supply Retorts, Tanks, Columns, Girders, Special Castings required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.
CHARLES HORSLEY, Agent.

ADDISON POTTER,
WILLINGTON QUAY,
NEAR NEWCASTLE-UPON-TYNE,
Manufacturer of
CLAY RETORTS, FIRE-BRICKS, AND EVERY DESCRIPTION OF FIRE-CLAY GOODS

THOMAS CARR & SON,
MANUFACTURERS OF
FIRE-BRICKS, LUMPS, TILES, RETORTS, &c., &c.,
SCOTSWOOD FIRE-BRICK WORKS,
SCOTSWOOD-ON-TYNE.

"SELLARS' CEMENT"
PREVENTS WASTE OF GAS FROM RETORTS;
SAVES CLAY RETORTS FROM DESTRUCTION BY FIRE;
GREATLY ECONOMIZES THE USE OF FIRE-BRICKS;
And PREVENTS ALL POSSIBLE LOSS of GAS FROM LEAKAGE.
J. C. SELLARS,
THE GAS CEMENT WORKS,
BIRKENHEAD.

CATOPTRIC LAMPS.
The NEW PATTERN
Is now placed throughout CHEAPSIDE.
For Terms of Licence to Use and Manufacture, apply to
Mr. SKELTON,
37, ESSEX STREET, STRAND.

GAS COAL.
POPE & PEARSON, LIMITED, have
now the authority of several of the most eminent Gas Engineers of London in stating that their Coal yields *in practical working over* 10,000 *cubic feet of gas, with an illuminating power of* 16 *candles;* or by the standard burners now used by the London Gas Companies, an illuminating power equal to 17½ candles.
One ton yields 12¼ cwt. of good coke. This Coal can be shipped from Hull, Goole, Liverpool, Morecambe, and Barrow.
For further particulars, apply to POPE AND PEARSON, LIMITED, West Riding and Silkstone Collieries, near LEEDS.

HEBBURN MAIN GAS COALS.
Cubic feet of Gas yielded per ton . . . 10,050
Illuminating power in sperm candles . . 15·4
Yield of coke per ton of good quality . . 13¾ cwts.
THE TYNE COAL COMPANY, LIMITED, OWNERS.
W. RICHARDSON, Fitter,
29, QUAYSIDE, NEWCASTLE-ON-TYNE.

PLUTONIC CEMENT,
For Repairing Gas-Retorts in Action, preventing Porosity, and reducing the Deposit of Carbon, is highly commended.
WILLIAM RICHARDSON,
GAS AND HYDRAULIC ENGINEER,
CHARLES HENRY STREET AND BISSELL STREET, BIRMINGHAM.

BIRTLEY IRON WORKS,
CHESTER-LE-STREET,
DURHAM.
Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.
Warehouse in London for Cast-Iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.
Agent in London, Mr. J. MANWARING, 101 Cannon Street, E.C.

JOHN DEPLEDGE,
Inventor of the
DRY-FACED CENTRE-VALVE FOR PURIFIERS,
GAS AND HOT WATER ENGINEER,
20, BRIDGEHOUSES, SHEFFIELD.

SCOTCH CANNEL COALS.
The Subscriber is prepared to contract for the supply of all the principal SCOTCH CANNEL COALS. Prices and Analyses of the various Coals will be forwarded on application.
JAMES M'KELVIE,
CANNEL COAL MERCHANT,
HAYMARKET, EDINBURGH.
Established 1840.

THE
FRAMWELLGATE COAL COMPANY,
DURHAM,
Are prepared to supply their
SCREENED AND NUT GAS COALS.
This Coal yields 11,000 cubic feet of gas and 13½ cwts. of coke per ton.
OFFICES: ROYAL EXCHANGE, MIDDLESBROUGH.

W. GARDNER AND CO.,
STEAM SAW MILLS,
13 WHARF, MACCLESFIELD STREET NORTH,
CITY ROAD,
Makers of
WOOD SIEVES FOR GAS PURIFIERS,
ROUND OR SQUARE, PARALLEL OR BEVELLED.
CHEAPEST IN LONDON.

C. & W. WALKER'S
WOOD PURIFIER SIEVES,
Which have now been used for fifteen years, and their advantages and durability fully established. They are made entirely by steam machinery in very large quantities at the most moderate cost.
MIDLAND IRON-WORKS,
DONNINGTON, NEAR NEWPORT, SHROPSHIRE.
8, FINSBURY CIRCUS, LONDON.

J. T. B. PORTER & CO.,
GAS ENGINEERS & MANUFACTURERS,
IRONFOUNDERS AND CONTRACTORS,
GOWTS BRIDGE WORKS,
LINCOLN.

ESTIMATES FOR GAS-WORKS OF ANY SIZE.
REFERENCES TO 500 WORKS ALREADY ERECTED.

N.B.—It is most particularly requested that all Communications be addressed to the FIRM ONLY, as circumstances have arisen which render this necessary.

G. J. EVESON,
GAS COAL MERCHANT,
STOURBRIDGE.
Delivery per Rail to any Part.

THE WIGAN COAL & IRON COMPANY,
LIMITED,
DISTRICT OFFICE: 18, BENNETT'S HILL, NEW STREET, BIRMINGHAM; AGENT: W. M'GOWAN;
Supply the Best Wigan Arley Mine Gas Coal, Gas Nuts, Gas Cannel, &c.
N.B.—The Wigan Coal and Iron Company, Limited, are exclusive owners of the well-known HAIGH HALL AND KIRKLESS HALL GAS COAL COLLIERIES.

THE SILKSTONE & DODWORTH COAL & IRON COMPANY, LIMITED,

DODWORTH, BARNSLEY.

BENJAMIN WHITWORTH, Esq., M.P. . . . . Chairman.
Mr. RICHARD HARTLEY . . . . . Managing Director.

REAL OLD SILKSTONE GAS COAL.

JAMES PATERSON, Esq., Gas Engineer, of the Warrington Gas Company, reported, Aug. 10, 1875:—

"This Coal possesses remarkable qualities as a gas and coking coal, and appears SECOND TO NONE IN THE KINGDOM. It contains the large quantity of 699 lbs. of illuminating matter, and 1498 lbs. of coke to the ton, and produces **12,240** cubic feet of 16·66 candle gas."

The above Company are raising nearly a thousand tons of the Real Old Silkstone Gas Coal per working day.

PRICES QUOTED TO ANY RAILWAY STATION, OR F.O.B. HULL, GRIMSBY, GOOLE, KEADBY, LIVERPOOL, AND FLEETWOOD.

ALBERT GAS COAL.

THE DERBYSHIRE
SILKSTONE COAL COMPANY,
LIMITED,

CAN OFFER A

GAS COAL

Of superior quality, delivered at any station in England and Wales.

Purified gas per ton of coal in cubic feet (average)	10,775
Weight of coke in lbs. per ton of coal	1,465

ANALYSIS AND PRICES ON APPLICATION TO
Mr. EDMUND TAYLOR, Secretary,
ALBERT COLLIERY, NEWBOLD, NEAR CHESTERFIELD.

MESSRS. NEWTON, CHAMBERS, & CO.,
THORNCLIFFE IRON-WORKS AND COLLIERIES,
NEAR SHEFFIELD,

STRONGLY RECOMMEND A TRIAL OF THEIR

CELEBRATED SILKSTONE GAS NUTS.

Analysis by F. J. EVANS, Esq., Chartered Gas Company, Horseferry Road, Westminster:—

(COPY.)

	Cubic Feet of Gas per Ton of Coal.	Illuminating Power in Candles.	Coke per Ton of Coal used.	Ash in Coke, per Cent.	Sulphur in Coal, per Cent.
Silkstone Nuts . . .	10·800	15·85	12·66 cwt.....	6·0	0·69

NOTE.—The illuminating power of the gas was tested by the standard burner now used in London by the Gas Referees, under the City of London Gas Act, 1868.

Horseferry Road, Westminster, March, 1870. (Signed) F. J. EVANS.

These Nuts are extensively used by various Gas Companies throughout the Kingdom, who bear strong testimony to their value.

APPLICATIONS FOR PRICES, &c., TO BE SENT DIRECT TO THE COLLIERY, AS ABOVE.

Established

1795.

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WORTLEY FIRE-BRICK WORKS,
NEAR LEEDS,

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THE "RELIANCE,"

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The object attained by this invention is the *correct measurement of Gas under every fluctuation of the pressure.*

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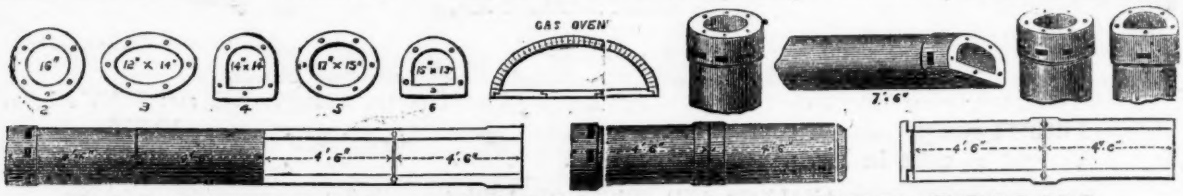

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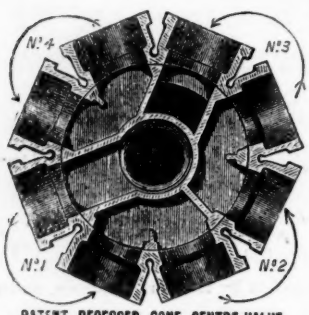
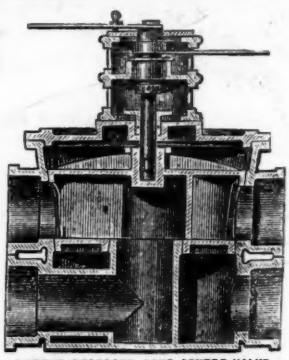


PATENT RECESSED CONE CENTRE-VALVE.
Sectional Plan.



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